The Iron Age

A Review of the Hardware and Metal Trades.

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Foot and Power Presses for Work in Sheet Metals.

The fact that American manufacturers excel in the production of machinery for special uses is evident to every intelligent visitor at the Centennial. As an illustration, we may mention the manufacture in this country of machinery for stamping sheet metal. The industry is a comparatively new one with us, but when once engaged in, the demand for special machinery was so promptly met that in a very few years we had brought the art of stamping to a perfection never attained on the other side of the Atlantic. Among the exhibits of this class of machinery at the Centennial we invite attention to those made by Oberlin Smith & Bro., of the Ferracute Machine Works, Bridgeton, N. J. They are shown in Col. C 27, Machinery Hall, within 30 or 40 yards of the great Corliss engine. We have space only for a brief description of three of the presses for sheet metal work shown in this department.

The Ferracute power presses are built of uniform design and in a series of regular sizes known as Nos. 1, 2, 3, 4, 5, &c. They are all changeable, without extra cost, from "upright" to "inclined," simply by screwing on the legs in a different position. The frames are all open backed to a width greater than the hole through bed-plate, thus enabling work to pass back or sidewise.

By the system of sectional patterns from which these machines are built various desirable modifications can be cheaply made to order, as, *e. g.*, with "open front" bed-plate; with "horn" bed-plate; with bed-plate adjustable up and down and entirely removable, &c. Any of the sizes or styles can be built with back gearing, or with a plain fly wheel.

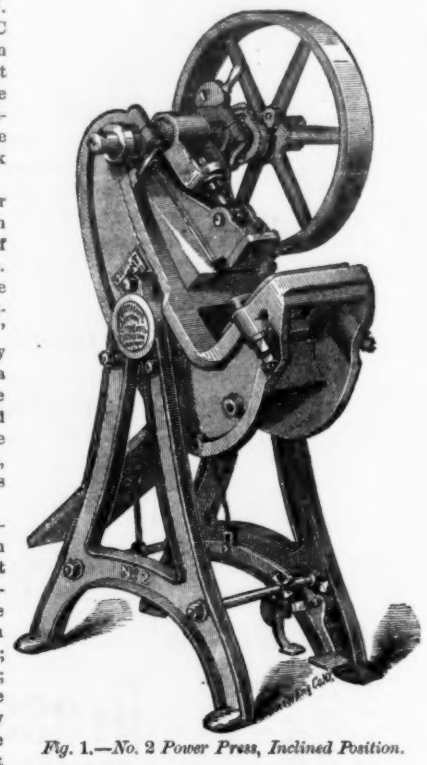


Fig. 1.—No. 2 Power Press, Inclined Position.

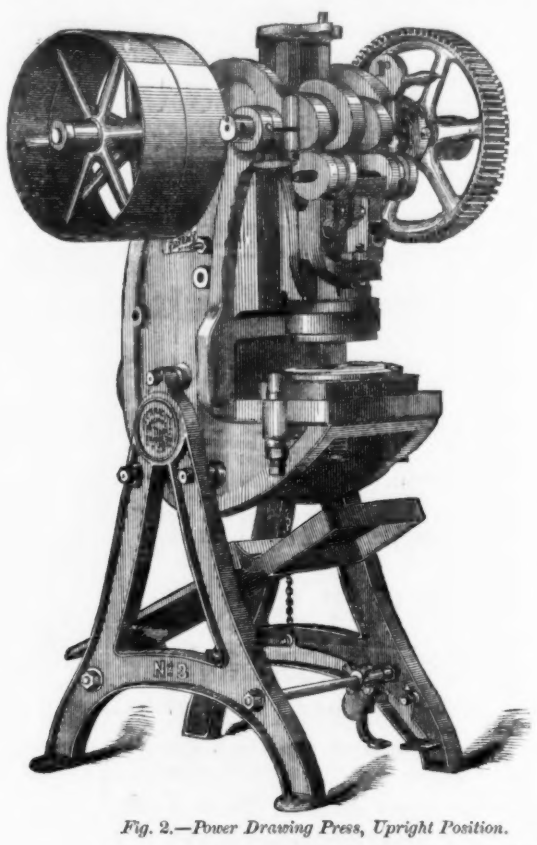


Fig. 2.—Power Drawing Press, Upright Position.

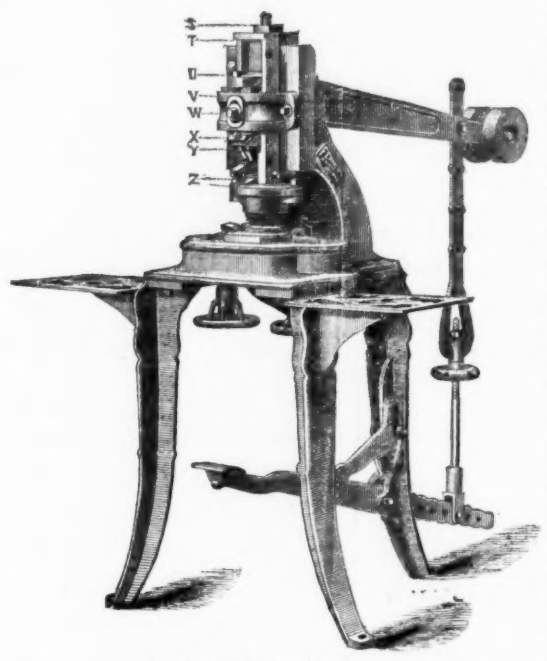


Fig. 3.—Foot Drawing Press.

FOOT AND POWER PRESSES FOR SHEET METAL WORK.

Recent valuable improvements merit special attention. Among these are: A main frame very wide and deep, of a section giving a uniform strength throughout, the widths at all points, counting from the front of the bed-plate back and up to the shaft journals, being derived from a parabola of the requisite form, and giving scientific proportions not approached in the thin flat bed-plate in common use; the changeable legs above mentioned, giving a combined upright and inclined press for the price of either separate; a very wide slide-bar of dove-tail section, set back of and extending above the shaft, thus giving extraordinary length of bearing and consequent firmness and accuracy in the working of the dies; an automatic clutch, attached to both treadle and hand lever, and provided with a positive stop so that it is impossible for the shaft to make more than one revolution by one action of the levers, also with an adjustable jaw for different speeds, and a safety pin by which the shaft can be revolved to any position, and the dies adjusted while the fly wheel is in motion, thus dispensing with the need of a counter-shaft; a set of die-clamps, consisting of hook headed steel bolts sliding in long true holes, which descend upon and firmly hold the dies without the need of removing nuts, &c.; a reversible treadle-lock operated with the foot, by which the treadle can be fastened down for continuous running, or up for safety when the press is temporarily stopped; a treadle bumper and stop of India-rubber, for securing a noiseless and limited motion; journal clamps for accurately and firmly setting the journal caps without the use of lock nuts; a reversible catch pan and shute for catching or sliding off the work.

Strength and solidity are aimed at in these presses by putting the metal where it belongs. This secures a beauty of form which is enhanced by neatly rounded corners and a uniform style of painting, rather than by "rainbow work" and uselessly polished surfaces. The proportion of cost thus saved is well invested in extra conveniences and durability of construction. The latter quality is secured by careful workmanship, scraped surfaces, standard reamed holes, case hardened bolts and nuts, steel shafts, clutches, pitmans, pitman nuts, die clamps, wrenches, &c. The pitman nuts have broad flanges bearing near the outer edge only, thus giving ample friction to prevent jarring loose.

Power drawing presses with quick return motion and powerful back gearing are made to order of any regular size. They are all arranged to cut and draw at one operation. The outer and inner slide bars descend rapidly together until the dies are ready to cut, after which they go slowly with increased power, the outer one stopping as soon as the "holding" die reaches the blank, while the inner one, with the punch attached, continues to the bottom of its stroke. As soon as the work is done they both return rapidly to their upper position, thus using the power to the best advantage without waste time. Fast and loose pulleys on the back shaft give a combined counter-shaft without extra cost. It will be noticed that the pulleys are very large and wide, and the ratio gearing high, thus giving ample belt power. To those not acquainted with the "drawing" process it may be interesting to know that it consists in holding the "blank" of sheet metal between two flat surfaces under pressure (sometimes several tons) whilst the central descending punch draws it from between them into a conical or cylindrical shape, leaving the sides without wrinkles—the metal being "upset" or thickened circumferentially, and stretched or drawn out radially, as the outer parts are reduced in diameter.

In the accompanying cuts, Fig. 1 is a fac-simile from a photograph of the No. 2 power press in its "inclined" position, and Fig. 2 of the No. 3 power drawing press in its "upright" position; scale, 1-16 of the actual size. They are fair samples of the other presses of the same kinds. Beside a number of smaller foot presses for fruit can and other work, the foot drawing press shown in Fig. 3 has recently been introduced. It is used for seamless blacking boxes, jar and box covers, or any other deep, smooth work up to 6 inches diameter by ¼ inch deep. It is a modification of the plain No. 3 foot press, consisting of an extra plunger working inside of slide T, and a holding frame attached to the press in front of the same. The "drawing process" is used to obviate the wrinkling which occurs on account of the reduced circumference of the tin when the edge of a lid is bent up at right angles. On narrow edges this is of no consequence, but when more than about 3-16 inch wide, the tin folds upon itself and tears, making very rough work. In "drawing," the blank, after being cut by a die on the outer slide, is held confined between two flat steel surfaces while the descending punch, attached to the inner side or plunger, draws it from between them, forms it to shape, and drops it beneath the press. To accomplish this the outer slide stops at a certain point, and is held under pressure by an accurate adjustment. The whole operation—cutting and forming—is done by a single stroke of the foot, both slides receiving their proper motion from the ascent of main lever. The "drawing attachment" can be removed and the press fitted for ordinary work in one minute.

Beside all kinds of presses and dies, this firm make a specialty of the various other tools used by can makers, such as solder cutters and molds, seamers, beaders, formers, shears, fire pots, cappers, &c.

Ramsey's Car-truck Shifting Apparatus.

One of the most interesting displays in Machinery Hall is that connected with the railway interests, and in addition to the exhibits of locomotives, palace cars, passenger cars, freight cars, car wheels, axles, springs, brakes, switches and rails, there are numerous ingenious appliances designed to accomplish almost every variety of purpose. One that attracts a great deal of attention, and is so obviously simple in every respect that the wonder is it was not thought of before, is this car-truck shifting apparatus, a working model of which can be seen in the Canadian Department, Section C 4, and which we now illustrate in the accompanying cuts. The inventor conveys the leading feature of the invention in his circular, which says: "The idea of raising a car body, weighing from 10 to 40 tons, to relieve the trucks, when the body can remain on the level, and the trucks roll out themselves, is no less erroneous than lifting a horse through a hole in the roof to get him out of the stable, when by opening the door he could walk out himself."

To make the matter more clearly understood, we may say that the object of the apparatus is the transfer of cars from one set of trucks to another set, without the use of jack screws or anything apt to strain the bed timbers or joints of the cars, in case of an injured or defective truck, worn wheels, &c. The process is simply in having a double track at each of the principal stations, where car wheels are regularly tested; a switch is placed having a depression or pit about 18 inches deep, with gentle inclines at each end, and on each side a narrow track remaining on the level, upon which is small but strong trucks designed to carry supporting beams or cross-bars, extending from one to the other across the pit, for the purpose of bearing the car body. The car is then brought forward till the auxiliary trucks are on a level with the others, the beams put in position and the car moved forward again, the king bolt withdrawn and the old trucks are released and run down the declivity, leaving the car supported on the cross-bars. New trucks are brought up in the same way, the king bolt inserted, and the car is again ready for a journey of any length.

FIG 1.

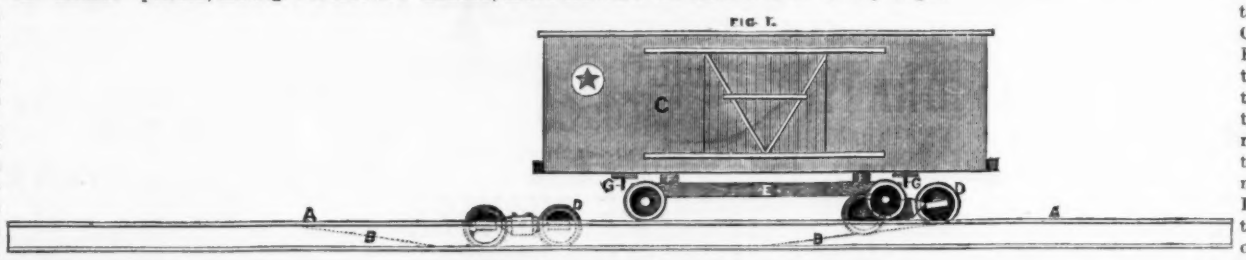


FIG 3.

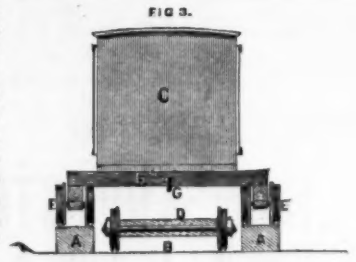
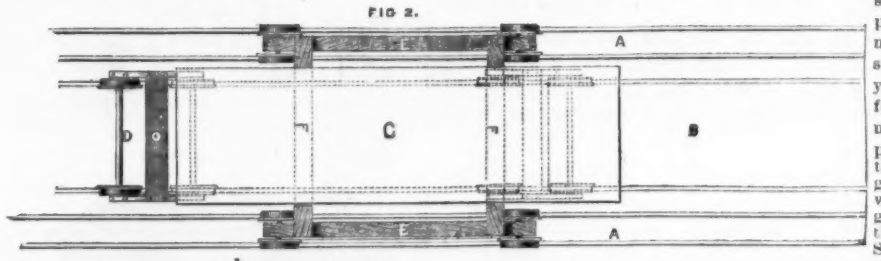


FIG 2.



RUMSEY'S CAR-TRUCK SHIFTING APPARATUS.

By this process a train of cars could be changed to a different gauge, with but a few minutes' delay. Fig. 1 is a side view of the depressed railway and trucks on level outside tracks supporting a car body. Fig. 2 is a top, and Fig. 3 an end view. A represents level outside tracks along the depressed main track. B, the pit, with incline at either end. C, the car body from which the trucks D are taken. D, trucks that have been removed from the car. E, the side trucks on outside tracks. F, the cross-bars for carrying the car body. G, the king bolt on the car body.

To separate the trucks from a car body, move the car to the incline of the pit B, and on each side run a side truck E; then push the cross-bars F under the frame of the car, the ends of the bars resting on the trucks at opposite sides, and by moving the car over the pit B, the car trucks D run down the inclined rails, leaving the car body C supported by the side trucks E and cross-bars F. The cross-bars may be more easily placed under the car frame by having the side tracks a little lower than the main track at the place of adjustment, and raised with gentle incline to the level before reaching the pit. To connect the trucks with the car frame, draw them up the incline with a rope, chain or ratchet, attached to the car, until the bolt hole of the trucks connects with the king bolt G of the car. Then, by moving the car forward, the king bolt draws the trucks to their proper place. A switch curving from each end of the shifting apparatus connects it with the main track, enabling a locomotive to back a car on either end. In case a train contains a car with a defective truck, uncouple it from the car following and back it to the incline of the pit, adjust the side trucks E and cross-bars F, as previously described for disconnection, and after removing the damaged truck, replace it with a sound one. This can be accomplished in from 3 to 5 minutes, avoiding transhipment, delay of freight, or detention of trains. A pair of short trucks are used at each end for parlor or sleeping cars, that are too large for the ordinary side trucks.

A London promoter of stock undertakings proposes a company to run "mortuary trains" from different parts of Europe to the summit of Mount Vesuvius. On reaching the crater the conductor will tilt the contents of the hearse car into the fiery abyss, "leaving nature in its grandest form to do the work of canceling the remains of humanity, and then take the surviving mourners a short excursion to Naples and its environs, in order to cancel the last remains of grief." Unfortunately for American railway managers our railway connections with volcanoes are at present incomplete; but if the enterprise proves a success abroad, it will not be impossible in a short time to construct lines to Cotopaxi and Popocatapetl, by which all the advantages of Vesuvius may be enjoyed, combined with the attractions of a long journey through regions of which little is now known

The most remarkable race in nautical annals ended in a dead heat. The contestants were two American vessels, the Southern Cross, Captain Ballard, and the J. B. Brown, Captain Bezar, and the course was from San Francisco to Liverpool. At 6 o'clock on the morning of the last day of the year they were towed out together and discharged their pilots at the same moment. They passed the Faralone Islands together, met next day, and parted company at night to meet again near the equator. Near Pitcairn's Island the rival clippers again came together, parting to encounter each other south of the line on the Atlantic side, where, during several days of light weather they were in company, crossing the equator literally at the same moment, bearing due east and west, a circumstance unparalleled in Captain Ballard's 26 years of East India trade. Another parting followed, succeeded by a rencounter in the northeast trades, where the ships were in company for a week. Off Holyhead they met for the last time on the 26th of May, got tugs together, raced up the Mersey side by side, and would have entered the docks together had the gates been wide enough, but as they were not, the J. B. Brown gave way and allowed the Southern Cross to reach her berth a length in advance, after a race of 147 days, extending over many thousand miles of water.

The history of petroleum is a romance full of lights and shadows, and abounding in the most dramatic surprises. Towns have sprung up in a night almost, and been deserted as rapidly. In three months from the day oil was struck at Pithole, a town of 10,000 inhabitants was in existence, and in a short time they have stolen away as silently as the Arabs, but unlike them had left their tents behind. The present advance in the price of crude is another of these surprises. Some weeks ago we ventured to predict $3 oil. As we write it is selling at $4 at the wells. Two years ago it was selling at 40 cents or even less. It is this liability to such great fluctuations that renders it so difficult to decide on the advantages of the use of petroleum in iron making. When oil is less than $1 experiments in this line are active, and there is some profit in using it, but the case changes when oil is $4.

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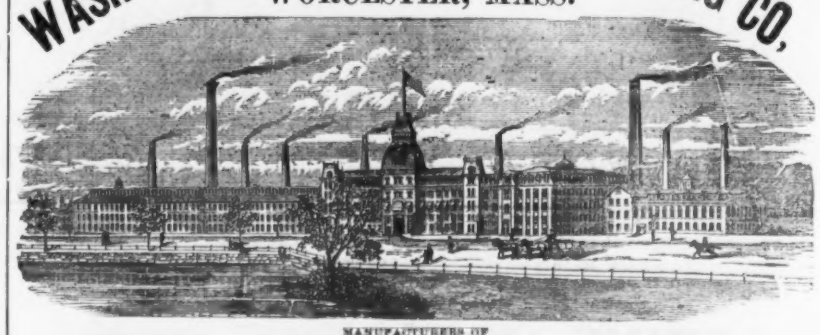

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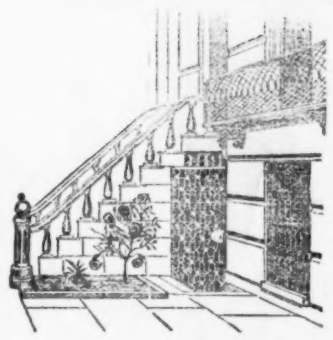
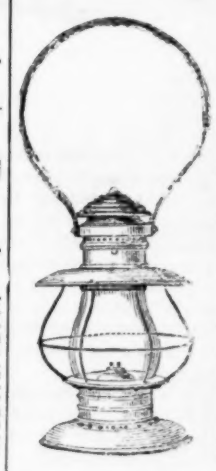


Ship and Railroad Lanterns,



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Tinned Wire, Tinned, Broom, Spring Wire, made from Bessemer Steel; Cast Steel and Iron Coppered Ball Wire; Rivet, Screw, Buckle, Umbrella, Fence, Brush, Gun Screw Wire; Sewing Machine and Machinery Wire. Fine Wire for weaving. Also Wire of any shape made to order.

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Wire straightened and cut to lengths. Represented in New York by

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Wheels and Rope for transmitting power long distances. Send for Circular and Pamphlet.

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A pure **BLOCK TIN PIPE** within a wrought iron tube, combining Purity, Strength, Durability and Cheapness.

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Sledges, Hammers,
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All warranted the Best Solid Cast Steel.

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Steamboat and Locomotive Gongs kept on hand. A liberal discount to the trade. Bell Hanging and Jobbing done to order. **4 DUANE STREET, N. Y.**

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REDUCED TO $7·50 PER DOZ.

These goods we *Warrant* not to be affected by climate, or **water, hot or cold.**

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Iron Wire, Curled Hair
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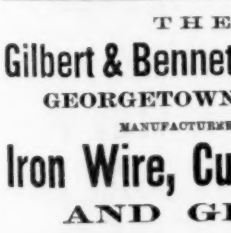

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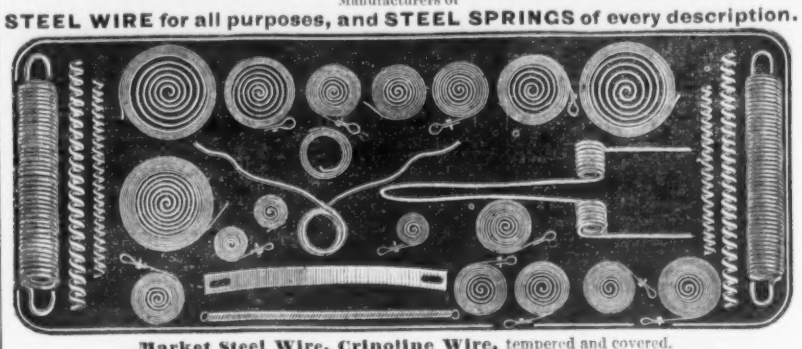

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Also **Patent Tempered Steel Furniture Springs,** constantly on hand.
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The Faultless Fruit Can.

PATENTED.

The perfection of this article, in all of the essential points of a good fruit preserver, has been thoroughly demonstrated by the **immense number sold.** The demand increases, but with largely increased facilities we shall be able to meet the wants of the trade. As the can tapers slightly when made up, **they nest together,** thus saving space greatly. The opening is the full size of the top of the can, admitting of perfect cleansing and drying; and so making them **much more durable.**

When not in use for Fruit they make a very nice receptable for Tea, Coffee, Spices, etc., the close fitting cover making it air-tight.

Another important feature is the **labeling device,** whereby the **contents of the can, date,** and **method of preserving** are easily shown. We furnish the **complete trimmings** for the **FAULTLESS CAN,** including the body all ready for soldering, at the following very low prices, viz.:

$8·50, 1 qt.; $10·50, 1½ qts.; $12·50, 2 qts. per gross.

Cans made up ready for use:

$9·75, 1 qt.; $11·75, 1½ qts.; $13·75, 2 qts. per gross.

We would caution dealers against an imitation of our can having a "swell" or "bead" near the top to prevent the cans sticking together when nested, as this feature is covered by our Patents.

The Trade only supplied.

Use good Sealing Wax for this, and all other cans, to secure good results.

F. STURGES & CO., Sole Manufacturers,
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This compound is put up and warranted genuine only in 1, 5, 10, 50 and 100 lb. packages, and can be obtained from the manufacturers direct, or from the following General Agents at manufacturers' prices, in large or small quantities:

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GEORGE D. HALL, St. Louis, Mo.
H. R. IVES & CO., Montreal, Prov. of Quebec.

It is also for sale in 1, 5 and 10 lb. packages by Hardware Dealers generally throughout the country.

PERFECT COMBUSTION BY AN OXYGEN BLAST.

By this process oxygen is imparted to the blast simply by its passage, on its way to the place of combustion, through a chamber or vessel holding an oxygen compound, from which, by the agitation of the air thereon, oxygen is set free and thus imparted to the blast. The **required volume** of this blast is **one-half less.** The **combustion** becomes **perfect** therefrom, all the **carbon** in the fuel being **converted** into a **high** and **concentrated heat, without smoke or gas,** but that of carbonic acid, being formed. Beside a **saving of fuel,** obtainable **in all cases by this blast,** advantages arise from it varying according to the appliance of the heat.—On Forge Fires it gives a **clean** and **intense heat, free** from all **sulphurous gas,** whereby a better and quicker welding is had and **time saved.** On fires under boilers for making steam, **the saving in fuel** is 25 per cent. and over, the **working capacity** can be **increased** in same ratio by reason of the intensified and accelerated combustion, which latter also **overcomes** the **disadvantages** connected with the **use of fine dust and impure coal.** Castings from a cupola in which the fire is sustained by this blast become of **superior quality, uniformly soft to work** and very **tough,** resembling **wrought iron** and **steel;** they forge hot and cold to some extent; the iron becomes **strengthened** and **purified,** being **freed from carbon and sulphur.** For blast furnaces this process becomes of **vast importance—it saves fuel, increases** the **working capacity, perfects** and **reduces the cost** of the metal, makes sulphurous and other impure ores fit for use. The serious drawbacks arising from imperfect combustion, caused mainly by otherwise uncontrollable atmospheric influences, are overcome. The work of a puddling furnace and that of **decarbonizing the iron,** both for **wrought iron** and **steel purposes** generally, is much simplified, shortened and perfected as to purity of product: the **work** of **so many hours** is reduced to as **many minutes** by this process. The process has the merit of being **simple** and **easily applied,** and with **but very little expense,** and this only for the needed chamber or vessel and its connection with the blast pipe; the vessel may be a wooden keg, barrel or larger cask or tank, properly lined, from two gallons for a single forge fire up to 500 gallons and over, according to the blast in use. The **cost of the oxygen** is conditioned by, and made subject to, its effect—it is but a **small item** compared to the **gains from it.** Although this process has been in **practical use for over a year,** the inventor felt reluctant to offer it to the public before having its **utility** and **practicability fully established,** beyond any and all contingencies, not from a theoretical standpoint, but from the **testimony** of **manufacturers** who have **used** the process **this last year,** and whose **standing** and **reputation** as **manufacturers** are of the **highest order,** and such as to **entitle them** to the **consideration of others.** For further information, and for small specimens of castings from this process, address

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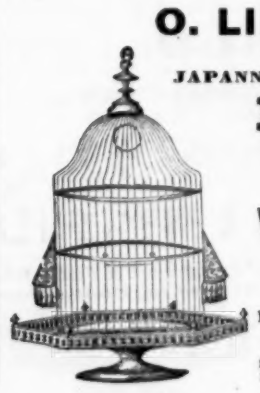
Manufacturers of

JAPANNED AND PATENT BRIGHT METAL

Bird Cages.



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New Patents.

We take the following abstract of new patents, recently issued, from the official record:

PROCESS OF DISINTEGRATING MOLTEN SCORIACEOUS SUBSTANCES.

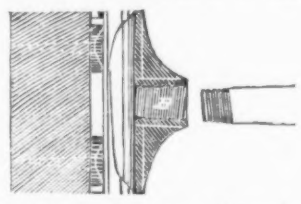
To A. D. Elbers, Hoboken, N. J.—August 1.—1. The method of forming scoriaceous substances into mineral wool by exposing the same

in a fluid state to the action of a rotary paddle wheel.

2. The combination of the rotary paddle wheel A with the conduit B and receptacle C, all combined for action on molten scoriaceous substances.

MODE OF REPLACING WORN OUT FAUCETS ON WATER PIPES.

To T. W. Rees, Philadelphia, Pa.—Aug. 1.—The method herein described of removing



worn out faucets from water pipes and replacing them by new ones, consisting in sawing off the old faucet near the barrel end, tapping the remaining socket piece, and screwing in the new faucet.

180,411.—*Machine for Molding Metals.*—William Barker, Baltimore, Md.—Aug. 1.

180,433.—*Valve for Steam Engines.*—J. R. Maxwell, Cincinnati, Ohio.—Aug. 1.

180,434.—*Steam Pump.*—J. Mayher, East Hampton, Mass.—Aug. 1.

180,507.—*Iron Fence.*—William L. Walker and Benj. G. Devoe, Kenton, Ohio.—Aug. 1.

180,550.—*Feeding Pulverized Fuel to Furnaces.*—Allin Cockrell, Lamar, Mo.—Aug. 1.

180,554.—*Metal Drill Bits.*—Garrett B. Cubberley, Milwaukee, Wis.—Aug. 1.

The improved drill bit, the same having three longitudinal angular grooves converging toward and separated by a slender central core of stock, and whose sides or walls are—viewed in cross section—in equi-angular planes.

180,643.—*Machine for Straightening Round Bars and Tubes.*—John B. Root, New York, N. Y.—Aug. 1.

180,663.—*Lock for Doors.*—John P. Sipp, Brooklyn, N. Y.—Aug. 1.

7248.—*Steam Hammer.*—Reissued.—F. B. Miles, Philadelphia, Pa., assignor to Ferris & Miles, same place. Patent No. 137,313, dated April 1, 1873.—Aug. 1.

180,439.—*Water Closet.*—J. H. Stevens, Cambridge, Mass.—Aug. 1.

An arrangement of the floor of the cabinet in which the commode is located with the mechanism which controls the discharge of the contents of the bowl, and the admission of water for rinsing the bowl and filling the trap, whereby the movement of the door, either in opening or closing, will empty the bowl and put in action the water supply.

180,440.—*Machine for Beading Stove Pipes.*—Andreas Syversen, Chicago, Ill.—Aug. 1.

Pipe is set on slanting holder, and secured between the holders. Former is advanced into the pipe and against one side thereof, and is revolved, whereupon the pipe is beaded and trimmed.

180,465.—*Chain Pump Bucket.*—Jacob F. Daugherty, Quincy, Ill.—Aug. 1.

180,474.—*Lamp Stove.*—Alden Gulliford, Cleveland, Ohio.—Aug. 1.

180,475.—*Furnace.*—Herbert Harrison, Goderich, Ontario, Canada,—Aug. 1.

180,485.—*Bottom for Tea and Coffee Pots.*—Edward B. Manning, New Haven, Conn.—Aug. 1.

180,486.—*Oil Stove.*—John McConnell, Cleveland, Ohio.—Aug. 1.

The disc-shaped wick tube carrier or cover is designed for water. The rib on the flange secures a space between the bottom of the cover and the top of the reservoir.

180,513.—*Cylinder for Pump Stocks.*—Parker Wineman, Rock Island, Ill.—Aug. 1.

A pump cylinder made of sheet iron coated on both or all sides with vitreous material.

180,522.—*Damper Regulator.*—George Beane, Windsor, Ontario, Canada.—Aug. 1.

180,529.—*Spinning Ring.*—John Booth, Central Falls, R. I.—Aug. 1.

180,611.—*Spinning Ring.*—William H. Magee, Woonsocket, R. I.—Aug. 1.

180,649.—*Combined Pipe Cutter and Screw Threader.*—Gelston Sanford, Stroudsburg, Pa.—Aug. 1.

The cutter adjusting screw has arms at its head, against which the ratchet lever strikes, thus feeding the cutter and working the ratchet at one operation; or the cutter may be fed by hand. To obtain a firmer bite for a screw threading die a sleeve is employed, engaging by a screw thread with a bush. This sleeve is clamped to the pipe by a set screw, but may be released when a sufficient bite has been obtained, and then serves as a bushing. The ratchet lever arm may be sectional.

180,678.—*Wind Wheel.*—Henry M. Underwood, Kenosha, Wis.—Aug. 1.

This invention consists in improvements in rosette wind wheels, and a peculiar arrangement of devices for transmitting motion from its crank to a rotary shaft below, and in a novel combination of devices whereby the stroke of the pump rod, driven by the wheel, is automatically lengthened and shortened, according to the speed of the wheel.

180,687.—*Lamp Extinguisher.*—Wallace W. White, Au Sable Forks, N. Y.—Aug. 1.

180,689.—*Urinal.*—Jos. M. Wilson, Philadelphia, Pa.—Aug. 1.

A vessel having tubular journals and fixed feed and waste cocks, with a perforated bottom, connected with waste, and having a wash pipe provided with a slot running around the top of vessel, is folded up against the wall when not in use. The cocks are worked by the movement of the vessel.

Hammered Artificial Stone.

The Cincinnati *Journal of Commerce* describes the manufacture of an artificial stone under the steam hammer, as follows:

After long and weary years of close and uninterrupted application a result has been attained in the manufacture of a most excellent and enduring quality of stone, which bids fair to completely revolutionize the existing state of things. By the application of the stroke of the steam hammer upon properly mixed proportions of hydraulic and common limes, hydraulic cements, pulverized iron slag, sand, broken stone, marble or granite, clays and minerals, inclosed in properly constructed molds and dies, a stone has been produced which is pronounced by the most skilled artisans and mechanical engineers superior to anything hitherto made; enduring as the Pyramids of Egypt themselves and unsurpassed in beauty and appearance by any stone ever quarried. Even marble has been made by this process equal in general effect to the purest Italian, and defying the best experts to tell it from the native marble itself. And this marble is made in all the different colors and variegations with any desired design or configuration upon its surface. Any design which can be cast or cut upon iron and steel plates, no matter how elaborate or delicate, can instantaneously be reproduced in marble or stone by the use of the marvelous means employed in the manufacture thereof. Not only can the work be done thoroughly and rapidly, but blocks of any desired size can be made, from the smallest and tiniest tiling stone to the largest and most massive blocks used in civil engineering. The time employed in making these blocks is no less marvelous than the invention itself. So quickly are they turned out that within a week to a month's time, according to the character and extent of the work, the blocks will all be ready for use in the hands of the builder. By the same method bricks of any desired quality, make, size and color can be forthcoming, and of a finish far superior to the most perfect pressed brick now in use, and with a rapidity of production hitherto unapproached. One great peculiarity about the Phœnix stone is this, that while the grain of the stone presents the appearance of ordinary stone, and is almost identical with it, so dense does the stone become under the repeated and heavy blows of the steam hammer that it loses all porosity, or porosity is reduced to the minimum, rendering it absolutely impervious to water or moisture. The absorption of water by brick is very great, as we all know, and to a greater or lesser degree this is true of all ordinary stones, but the most repeated and prolonged tests by water fail to make any impression upon the surface of the Phœnix. This, it will be perceived, is of the utmost importance, especially where stone is required under water, and where it is subjected to the action of the elements, frost, etc., as well. A steam hammer with a ram of 2500 pounds is capable of manufacturing at the rate of 100,000 brick and 10,000 feet of flagging daily, and building material in the same proportion. The inventor claims that he has once for all solved the vexed question as to the pavement of carriage-ways in cities, and maintains that when its merits are fairly tested, it will supersede all other pavements, being not only equal in durability with the famous Belgian pavement, but in many points much preferable to it. It will prove a great boon to those cities where stone for such purposes is scarce and expensive. Samples of this stone can be seen at the Centennial grounds, at the crossing of the Sunken Garden, nearly opposite the Woman's Building, at the works and at the office of the company. The attention of engineers, architects and builders is called to this subject as one which is of much, and in many cases vital, importance to them. It is the intention of the proprietors of the patent, the Phœnix Stone Manufacturing Company, to dispose of the right to manufacture this stone in such places as may seem desirable, and a chance is now afforded to capitalists and others of investing in something for which there is almost an unlimited demand, and that will bring large remuneration to investors.

Salt Wood.—It is a curious fact that in the salt mines of Poland and Hungary the galleries are supported by wooden pillars, which are found to last unimpaired for ages, in consequence of being impregnated with the salt, while pillars of brick and stone, used for the same purpose, crumble away in a short time by the decay of their mortar. It is also found that wooden piles driven into the mud of salt flats and marshes last for an unlimited time, and are used for the foundation of brick and stone edifices; and the practice of docking timber by immersing it for some time in sea water after it has been seasoned, is generally admitted to be promotive of its durability. There are some experiments which appear to show that, even after the dry rot has commenced, immersion in salt water effectually checks its progress and preserves the remainder of the timber.

A Monolithic Aqueduct.—The aqueduct from La Vanne to Paris, 135 miles long, is nearly entirely of *beton Coignet*, or artificial stone. The Fontainebleau section of 37 miles, over dry quicksand, is composed of a series of arches, some of them 50 feet high. Eight or ten bridges, of span from 75 to 90 feet, are also of *beton*. The composition for foundation and gravel walls is sand, 2½; gravel, 2½; hydraulic lime, 1; Portland cement, ¾. For pillars, abutments, &c., sand, 4; hydraulic lime, 1. The other portions, sand, 4; hydraulic lime, 1; Portland cement, ½ to ¾.

Iron.

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Successors to GAM'L G. SMITH & CO.,
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MIDVALE STEEL WORKS.
A full assortment constantly on hand of
Cast, Machinery, Tool, Spring, Tire, Sleigh Shoe, Toe Calk, Plow and Blister Steel.
Orders solicited for
Steel Tyres and Axles,
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Established 1790,
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Ulster Iron.
All sizes and shapes kept in stock.

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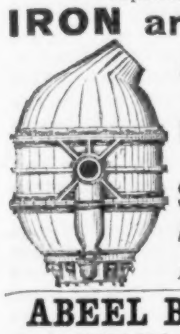
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Bessemer Steel.
MACHINERY STEEL,
Cast Steel and
SPRING STEEL,
ANGLE and T IRON.
Special Irons for Bridge and Architectural Work.

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Established 1765 by ABEEL & BYVANCK,
Iron Merchants,
190 South Street and 365 Water, N. Y.
ULSTER IRON
A full assortment of all sizes constantly on hand.
Refined Iron,
Horse-Shoe Iron,
Common Iron.
Band, Hoop and Scroll Iron.
Sheet Iron.
Norway Nail Rods.
Norway Shapes.
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A. R. Whitney & Bro.,
Manufacturers of and Dealers in
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48, 50 & 52 Thomas, and } NEW YORK.
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Used in the Construction of
Fire-Proof Buildings, Bridges, &c.
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Passaic Rolling Mill Angles and Tees.
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Paxton Rolling Mills.
Books containing Cuts of all Iron now made, and Sample Pieces at office. Please address 58 Hudson Street.

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Hickcox Mfg. Co.,
280 Pearl Street, N. Y.,
Manufacture the Patent Corrugated Iron Shingles, making the most durable Roof in the market, not affected by contraction or expansion, which causes soldered tin roofs to leak. Price only $6.50 per square, painted on both sides, packed ready for shipping.

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L. N. Lovell, }
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Bands Hoops & Rods,
AND
Borden Mining Company's
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Constantly on hand. Horse Shoe Iron and Nails, Norway Iron, Cast Spring, Toe Calk, and Bessemer Steel Tire.
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For Truck and Carriage Makers.

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Galvanized Hoop Iron of all widths.
Galvanized Staples.
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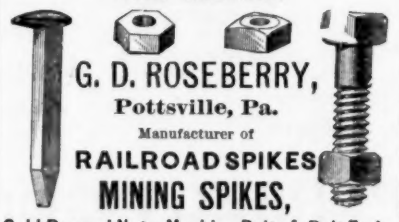
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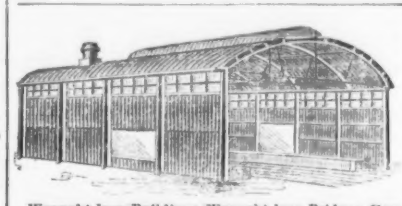

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The superior quality and cheapness of the production of my **PATENT FRUIT CAN TRIMMINGS** (Patented April 6, 1875), having induced certain parties to infringe my patent, I have compelled them to cease manufacturing, and I will proceed against any one who may infringe in the future.

The Very Best
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(3 1-2 Inch Opening,)
Are manufactured under process patented April 6, 1875, at the
WOODBURY STAMPING WORKS,
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I am making arrangements to the end that at least one prominent house in all the principal cities of the United States will keep a supply of my trimmings, for the trade.
J. M. PATTERSON,
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☞ Samples furnished free upon application accompanied by business card.

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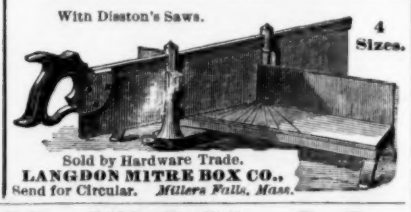
With Disston's Saws.



4 Sizes.
Sold by Hardware Trade.
LANGDON MITRE BOX CO.,
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American Steel at the Centennial.

NO. II.

It is a source of no little satisfaction to us to find the views we advanced in our last regarding the increase in the use of American steel in this country, and the decrease in the use of English, so amply confirmed by the English journals and their trade reports. The British *Trade Journal*, speaking on this subject, says: "It is no longer possible to disguise the fact that English steel has had its best day in the American market. Everything points to that conclusion, and our consul, writing from San Francisco, says 'it is only a matter of time when the foreign manufactured article will cease to be imported. Large consumers of steel are using American in the manufacture of axes, chisels, scythes and edge tools generally, and hammers and sledges.'" The opinion of the *Ironmonger* and the Sheffield *Independent* were quoted in our last issue, and this is not the whole story. We are exporting to England steel and its manufactures not spasmodically, but regularly. To be sure, the amount is not large, but the fact that it is done at all is significant. We well remember the first public announcement of Disston's consignment of saws to Sheffield, and the fun the English trade journals poked at us about it. Now they say: "In the saw trade the position of things is being reversed. Formerly, we supplied America with saws; now, manufacturers there have not only secured almost complete monopoly of their own markets, but they are sending their goods here in large quantities. There are only about two Sheffield houses who are now sending saws to America; but several here are buying from them, as they can do so on more advantageous terms than they can produce the goods themselves."

And if they had added the saws are better, the arch would have been complete. If we are rightly informed, only American steel is used in manufacturing Disston's saws. We believe that the position that American steel holds today has been hastened by the very attacks made upon it, and more especially that of May, 1874, before the Committee of Ways and Means. This has aptly been termed the Waterloo of the importers. The testimony then adduced as to the quality of American steel from those who had given it careful and thorough trials, that its opponents were forced to try it, and the result we have already given. But to continue our notices of American steel at the Centennial, the display in Machinery Hall of

THE MIDVALE STEEL WORKS,

of Nicetown, Philadelphia, is among the best American exhibitions of steel in the Exposition, especially in large masses and tires. This establishment makes both crucible and open hearth or Siemens-Martin steel, and were the first to introduce successfully the manufacture of steel railway tires into this country. Others had imported blooms and forged the tires, but at these works the entire work was done. The exhibit consists of a Siemens-Martin steel ingot, weighing 7000 lbs., 20 inches square and six feet high; a group of six tire ingots, cast from the bottom through a central runner; a "punched" and a "beaked" bloom, thus showing the first three stages of locomotive tire making. A tire tested under pressure, its inside diameter having been reduced from 55 3-16 inches to 26 15-16 inches; also, several tires, both flanged and plain, of various sizes; a crucible cast steel hammer die, weighing 3500 lbs., and a cast railroad crossing of the same metal, as well as several steel forgings very neatly done, comprising frog tongues, points, side bars, center plates, turntable plate and ring, wrist and crank pins. A forged gun tube 11 feet 7 inches long, 12⅛ inches diameter, a sample of which, tested at the Washington Navy Yard, showed limit of elasticity between 50,700 lbs. per square inch, and 54,070 lbs. per square inch; ultimate breaking strain, 83,824 lbs. per square inch; elongation under strain, 16·5 per cent.; diameter, ·06, of section at fracture reduced, 14·25 per cent; also two Siemens-Martin steel ingots tested at the same place, showing limit of elasticity between 62,776 lbs. per square inch and 67,260 lbs. per square inch; ultimate breaking strain, 122,300 lbs. per square inch; elongation under strain, 16⅛ per cent.; diameter of section at fracture reduced 15·8 per cent.; also two cases of fine fracture and test pieces; two Siemens-Martin steel rails twisted cold; a passenger car axle bent cold without annealing, and a variety of steel axles for cars, tenders, trucks and engines. These axles were the first in America to stand the Pennsylvania Railroad tests, and have never failed in use. One axle out of every heat is tested under a 1700 lb. drop, which falls on it from a hight of 25 feet five times, the axle resting on three foot bearings, and being turned after each blow, and under this severe test none have ever broken. These works were originally started in 1866, under the title of the William Butcher Steel Works, and after various fortunes a new organization was effected in August, 1873, under the presidency of Wm. Sellers. The largest single contract for steel ever given in the world, probably, was that for the construction of the bridge over the Mississippi, at St. Louis, built by the Keystone Bridge Company, of Pittsburgh. The contract was for upward of 3000 tons, and was to stand a strain of 90,000 lbs. to the square inch, and compression equal to 40,000 lbs., without permanent set. This company have also made a large number of rail blooms from open hearth steel for the Reading Railroad, samples of which are in the exhibit of this company in the Main Building.

PARK BROS. & CO.,

Black Diamond Steel Works, Pittsburgh, make a double display, one in the Government Building, in the main avenue, occupying a space 27 feet long by 4½ feet wide, and the other at T 62, Main Building. In the former exhibit they show steel in every stage of its process of manufacture, beginning with the raw material and ending with the finished product, classified as follows: Palmer ore from Lake Champlain, Missouri ore and Lake Superior ore, crushed, washed and calcined ore, loop, billet, pig metal, puddle ball, bloom, rolled iron, blister bar (A. B. Steel), in a crucible ingots of steel in various forms partly broken, to show the fracture and appearance of the steel after casting; finished bars of steel, hammered and rolled sheets and plates. Specimens of homogeneous steel plate are shown flanged, and samples bent cold to show the superior ductility of this metal, and a plate 20 feet long 32 inches wide and one-quarter inch thick tightly coiled in a roll of the same material. An interesting part of this exhibit is the samples of tools drawn from the ingots and still attached, showing the ingot as cast from the mold and the finished tools all in one piece. The tools shown are chopping axe, broad axe, pick and mattock and file. Bars of cast steel, round, square and octagon of large sizes are shown broken to display the fracture. In the center of the inclosure is a pedestal and shaft made from a great variety of shapes of cast steel, 16 feet in hight from floor to top of shaft. The pedestal is 5 feet high, and comprises square blocks and bars of die steel at the base, octagon die steel and railroad axles for the corner columns. The panels are formed of squares, flats, rounds, "pivot," "eye-pin," shapes and sheet steel, both plain and polished. The shaft is composed of round machinery and spindle steel, surmounted with an ornamental cap and steel guidon. A large plate glass case contains a variety of solid steel edge tools, with the eyes punched, also files, cutlery, taps and dies, etc., all made by consumers using "Black Diamond" steel. Placed about the space are various samples of agricultural steel, such as plow moldboards, cultivator shovels, hardened and polished. The rail surrounding the exhibit is of homogeneous steel twisted cold, and its supporting columns are of bar cast steel of different shapes and sizes, together with bases, caps and nuts of homogeneous steel bent cold. In the Main Building the exhibit is very much the same as in the Government Building, consisting of loop, billet, pig metal, puddle ball, bloom, bar iron, blister steel in a crucible, bar steel, rolled and hammered in various shapes, for axes, hatchets, files, etc.; sheet steel, for reaper section knives, saw plates, plow steel bars of square, octagon and round steel, broken to show fracture; columns consisting of square, flat and round cast steel bars, round machinery and spindle steel. Specimens of combination iron and steel for burglar proof safes; iron side and iron center plow steel; cultivator shovels and moldboards, both hardened and unhardened; oil well bits; reamers and jar quarters; railroad frog points, plates and side bars and a large plate of homogeneous crucible cast steel, 168 inches long by 72 inches wide. Specimens of difficult flanging of homogeneous steel plate in various shapes, and small samples of same material bent cold, the whole inclosed by steel railing, twisted while cold. The works of this firm are at Pittsburgh, and are among the most complete and most extensive in the country. In these works the entire process of steel making is carried on, from the manufacture of puddle bloom and blister steel up to the finest grade of tool steel, not including, however, open hearth nor Bessemer, though Mr. Jas. Park, Jr., is one of the proprietors of the pneumatic process in this country. Mr. Park has done much to bring the steel industry of this country to its present state of perfection, and has the consciousness of knowing that the "Black Diamond" steel is, at least, abreast of any in the world.

FARIST & WINDSOR,

Bridgeport, Conn., have a small but somewhat interesting exhibit of steel in Machinery Hall. In a show case they show the process of making knives and forks from the bloom up, through the processes of rolling to sheet forging, shaping, hammering, etc. In the same inclosure is a display of elliptic and coil springs made from their steel.

MESSRS. COOPER, HEWITT & CO.,

who are the owners, or sole representatives in the United States, of the various patents relating to the manufacture of steel in the open hearth, show samples of their Siemens-Martin steel and its products from their New Jersey Steel and Iron Co.'s mill. The Siemens Martin plant at this mill was the first of the kind in the United States, being erected in 1868, and consists of four gas producers of the ordinary type, a Siemens pre-heating furnace for heating the materials employed, and a 5 ton melting furnace, together with the necessary molds, flasks, ladles, ovens, cranes, etc. According to the method of pouring originally adopted, the ladle is keyed to the back of the furnace, and the ingot-molds, which are filled in groups, are passed under the ladle on a carriage driven by steam-power. The steel is worked into the various forms for which open hearth steel is used, such as plates, forgings, etc. At these works is a sponge furnace designed by Mr. Edward Cooper, intended to supply iron sponge to the steel furnaces. The ore is reduced to the metallic state by the continuous circulation of a current of hydrogen and carbonic oxide gases. The operation of the furnace has not yet passed the stage of experiment.

THE NASHUA IRON AND STEEL CO.

is at present the only rolling mill for either iron or steel in New Hampshire. Its product is steel in open hearth, and it makes no high grade tool steel but the lower grades, such as homogeneous plates, machinery steel, tire and band steel and forgings, samples of all of which are exhibited in Machinery Hall at E 66 and 67. Among those shown is a good specimen of cast steel shaft, weighing 7500 lbs., together with cranks, axles, driving axles, builders' cast steel, locomotive tires, and homogeneous plates for fire-boxes, boilers, tanks, etc. They also exhibit elastic wheels with steel tires made under Jas. A. Woodbury's patent.

JAS. ROWLAND & CO.,

of the Kensington Iron and Steel Works, in addition to their well known brands of anvil iron, show plow, shovel and cultivator steel.

THE OTIS IRON AND STEEL CO.,

of Cleveland, O., make only Siemens-Martin steel, and show some noticeable specimens at T 65, Main Building, consisting of ingots, bars, plates and forgings. One bar shown is 20 feet long by 5 inches square. Some fine specimens of boiler, fire-box, tank and oil still bottom plates are shown. For the latter use steel seems to be particularly well adapted, its record, in comparson with iron, being very much in its favor. Among the plates exhibited is one 21 feet 2 inches long, 6 feet 2 inches wide and 2 inches thick, a circular one 87½ inches in diameter, and a plate flanged from a 1 inch hole to 16 without the least sign of flaw or crack. The axles of this company are winning for themselves a very enviable reputation, and are in use on some of our prominent roads, among them the Pennsylvania. In the display are some test pieces, broken at Colt's Armory, that are of considerable interest to steel users. The size, breaking strain per inch and contraction of section are given below:

	Breaking Strain.	Contraction. Per cent.
Round	82,300	1
"	72,400	41
"	54,900	52
Flat	65,600	49
"	71,900	51
"	53,700	57
"	49,000	66

THE CLEVELAND ROLLING MILL CO.,

in their very extensive and varied exhibit, concerning which we shall have occasion to speak again, show some very fine samples of Siemens-Martin steel, and boiler plate bent, flanged and stamped in every conceivable shape, showing the quality and great tenacity of the metal. Some of these are shaped like jockey caps, and attract considerable attention. They also exhibit a great variety of forgings, such as points and heel points, crank pins, spindles, etc.

THE PITTSBURGH STEEL CASTING COMPANY

make no special display of their own, but have in the exhibit of the Siemens' furnace some samples of their steel castings. These castings are solid cast steel, the steel being made as cast steel is made, and cast in molds in sand. They are not converted nor is the material a mixture of steel and iron. The experience with steel castings in this country has been different from that of England. We have been successful, in the latter country the reverse seems to have been the result. The reason of this may be what we have already suggested as the cause of the quality of our steel, viz., a better common iron for mixture. This company have made heavy castings of 3000 pounds weight, such as propeller hubs, and are making heavy gearing rolling mill, agricultural and engine castings in great variety, also railroad frogs and crossings and other articles requiring great solidity and strength. By a new process they can make steel castings of any desired pattern and of any quality of steel as true and perfect as the best iron castings made. The superior strength of steel castings, and the fact that they can be forged and welded as easily as bar steel, and their comparative cheapness, must make them desirable for a great many purposes for which forged iron and steel have heretofore been used.

NES SILICON STEEL.

Charles M. Nes and S. J. Mintzer, of Philadelphia, exhibit at T 63, Main Building, some samples of steel bars, shares, cultivator teeth and steel capped rails, made, we presume, by the process named for Mr. Nes. We had the same trouble at this exhibit that we had at a score of others, viz., the impossibility of learning anything concerning it. Some specimens of ore are shown, and again we presume that it is the peculiar silicon ore used in the process. This ore is a mica-schist magnetite containing from 30 to 40 per cent. of magnetic oxide of iron. The process of manufacture of steel consists simply in mingling the pulverized ore with molten cast or pig iron, and by oxidation reducing the percentage of carbon until it reaches the standard of low steel. The ore used is from York county, Pa. Views as to the value of this process differ widely, though it seems undeniable that rails made by it last longer than iron, and can be rerolled.

Cheap Railroads.—The *Railway Age* says: The cost of railroad construction has been so remarkably reduced within the last three years, that the roads now building will be able to do business at a great advantage over the older roads. Not only are numerous narrow gauge roads being built at the rate of from $6000 to $9000 per mile, but the new standard gauge lines are costing, in many cases, scarcely half they would have cost ten years ago. The Columbus and Toledo Railroad, in Ohio, now rapidly approaching completion, while it is a first-class railway in respect to alignment, grades, ties, road bed and rails, and one-half of the rails are of steel, has cost, it is said, on the average, only $15,000 a mile. If this rate is not exceeded when the whole 121 miles of the road are completed, the company will have an immense advantage over its neighbors in respect to cost and the consequent portion of its earnings required to meet interest on the original investment. To illustrate this we take at random from the report of the Ohio Railway Commissioners, the figures showing the cost of construction, without equipment, of several of the roads in that State:

Columbus and Toledo, as above reported	$15,000
Cincinnati, Hamilton and Indiana	26,000
Marietta, Pittsburgh and Cleveland	36,526
Cincinnati and Muskingum Valley	37,319
Central Ohio	39,086
Columbus and Hocking Valley (of which the Columbus and Toledo is virtually an extension)	98,000
Cleveland, Columbus, Cincinnati and Indianapolis	54,018
Pan Handle and Youngstown	52,915
Little Miami	53,486
Cincinnati and Springfield	63,524
Cleveland and Pittsburgh	64,187
Lake Shore and Michigan Southern	66,540
Cincinnati, Hamilton and Dayton	72,342
Cincinnati and Indiana	99,132

It is certain that if railroads can now be built at one-half, one-quarter and even one-sixth the cost of existing roads, the new roads ought to make money if the old can even live.

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Cleveland, Brown & Co.

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CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore	$4 00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do	12 50
For each additional constituent of usual occurrence	1 50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
For determining the per cent. of Sulphur and Phosphorus in Iron or Steel	14 00
For each additional constituent of usual occurrence	6 00
For the per cent. of Carbonate of Lime, and Insoluble Silicious Matter in a Limestone	10 00
For each additional constituent	2 00
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal	12 50

or determining the constituents of a Clay, Slag, Coke, or of an Ash of Coal the charges will correspond with those for the constituents of an ore.

For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application.

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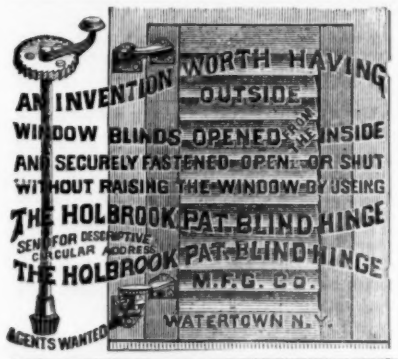
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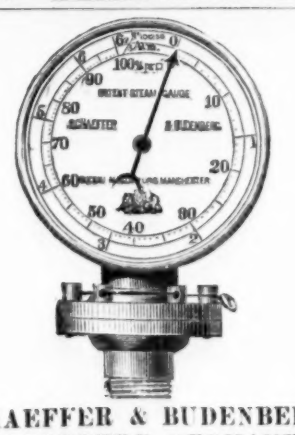

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Flat Bars up to 6x2. Rounds and Squares up to 4 inch, Ovals, Half Ovals, Half Rounds, Box Iron Cylinder Bars, Plow Beam Iron, &c. Also, Hoop, Band, Horse Shoe and Shafting Iron of superior quality. A full assortment in store after February 1st.

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All patterns kept in store or made to order. Link and Pin Iron in stock.

CAPACITY OF WORKS FOR 1876.

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Railroad Iron	40,000 "
Railroad Splices and Couplings	5,000 "

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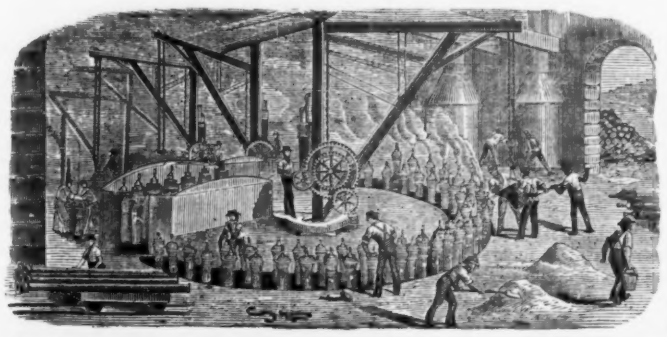

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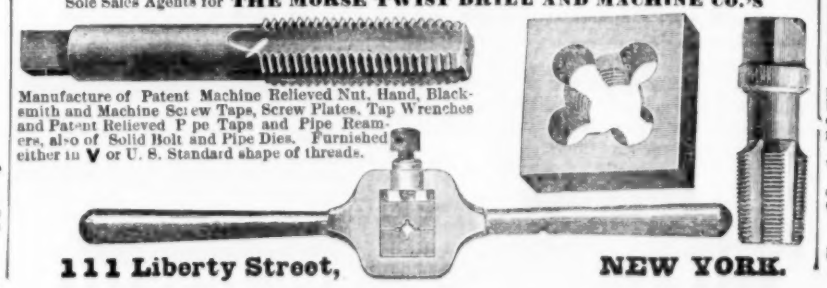

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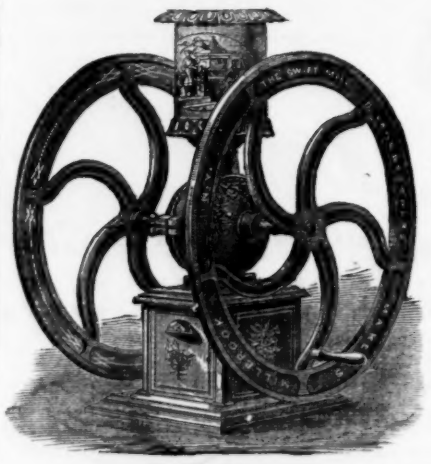
ESTABLISHED 1845.



No. 16.

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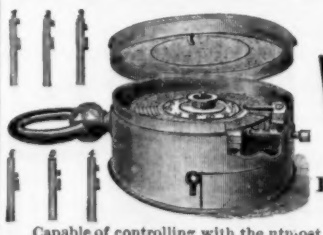

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CAUTION.—The public are notified that in my suit against Imhæuser & Co., of New York, a decree was made in my favor, June 10, 1874.

Proceedings have been commenced against said Imhæuser & Co., for selling clocks contrary to the order of the Court, and especially the clock with a series of springs in the cover and marked "Patented Oct. 20th, 1874." All persons discovered using these infringing clocks will be dealt with according to law.

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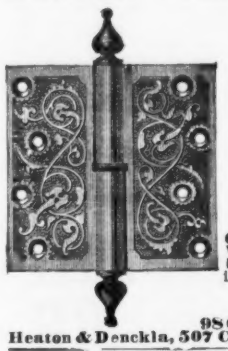

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ESTABLISHED 1858.

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Of Cotton Linen and Steel.

For all purposes for which Tape Measures are required.

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FINE TEMPERED STEEL SPRINGS,

FINE TEMPERED STEEL BAND SAWS,

From ¼ inch wide upward. Warranted tougher than any other Band Saw. Catalogues on application.

WATERS' IMPROVED

Pruning Implements

Are made of best steel on scientific principles.

Light, practical, durable, cheap.

Has no competitor for public favor, as thousands can testify.

See same in Agricultural Hall, Centennial, Philadelphia, Column T, No. 25.

Orders for fall trade should be made early.

Manufactured only in this city.

Send for circular and price list.

E. S. Lee & Co.,

ROCHESTER, N. Y.

Steam Engine Cut-offs.

(Continued.)

In resuming consideration of this subject, commenced in the issue of July 27th, of *The Iron Age*, it will be necessary, for the purpose of making a distinction between the two classes, *i. e.*, those which require to be adjusted to the proper point by the engineer, and those which perform that function automatically, to apply to each a term which may be taken as indicative of its action. For this purpose the term "adjustable" may be used to distinguish the former, and "variable" the latter, as both appear to be appropriate and sufficiently specific. Although there is no accepted authority for thus designating them, both terms being applied indiscriminately to either class, yet it would appear to be a misnomer to call the first mentioned a "variable" cut-off, as the term seems to imply that the adjustment not only admits of variation, but that it actually does vary according to existing circumstances, while the word "adjustable" would appear to be appropriate only as applied to devices which are capable of being adjusted but not of adjusting. As the Putnam engine, previously mentioned, belongs to the variable class, we will continue the subject by referring first to those which may be included under that head, the number exhibited being comparatively small.

C. H. BROWN & CO.,

of Fitchburg, Mass., have in operation, in the saw-mill annex to Machinery Hall, an exquisitely finished horizontal engine, which, as a specimen of workmanship alone, is worthy of a more conspicuous location. The design of the housing is good, and resembles what is familiarly known as the Corliss pattern, which appears to be in considerable favor among engine builders. Although similar in this respect to the Corliss engine, it is in all other points of construction and action radically different, and is undoubtedly worthy of being classed among the best of the representatives of the variable type. Like the before mentioned Putnam engine the eccentric is replaced by gearing, which transmits the rotary motion of the main shaft to a shaft parallel with and below the axis of the cylinder. From this shaft the motions of the valves and governor are derived, as hereafter specified. The valves, of which there are four (one steam and one exhaust at each end of the cylinder), are independent, and although the slide valves—the fact of each having but one function to perform for each revolution, *i. e.*, admitting or exhausting the steam—are necessarily of different construction from the ordinary slide valves, which are required to regulate both induction and eduction twice in each revolution. The exhaust valves are horizontal, and travel at right angles to the cylinder, the motion being derived from cams on the longitudinal shaft, and being positive in both directions. The shape of the camways is such that the motions of the valves in opening and closing are very quick, and allow of their remaining stationary during nearly the whole stroke of the piston, thus insuring a perfectly free exhaust, and preventing any possibility of back pressure. The steam valves are vertical, and are operated by eccentrics on the cam-shaft, in connection with the following device for regulating the point of cutting off: A vibrating lifter, having the fixed center at its outer end, is connected at about the middle of its length with the eccentric rod, while the inner end engages a spring catch or projection on the valve stem, giving to the valve a positive motion on the lift or up-stroke, and allowing of its being tripped, or released for closing, when the point of cut-off is reached, slamming or jarring being prevented by means of small air cushions or dash pots. On the spring catch of the valve stem is an inverted wedge, by means of which the valve is tripped in the following manner: The governor—a modification of the centrifugal form—receives a positive motion from the cam-shaft by means of bevel gears, and by its variations causes the oscillation of a rod running parallel with the shaft and back of the valve stems. On this rod, and opposite to each wedge, is an arm, which, when the speed increases, is moved by the governor toward the wedge, thus drawing the catch away from the lifter as it rises, and allowing the valve to drop, while the lifter continues its motion to the end of the stroke and return, when it engages the catch as before. Both steam and exhaust valves have exceedingly large areas of opening, which, in connection with their quick motions, entirely obviate the danger of wire-drawing the steam or crowding the exhaust, and thereby causing back pressure. The whole operation of the engine, particularly the valve motion, is admirable, all the parts working smoothly and noiselessly, and giving evidence of the excellence of the workmanship employed in its construction. As an illustration of the small amount of power required in working the valves, may be mentioned the manner of operating by hand, which, in place of the starting bar usually employed, is simply an 8 inch hand wheel on the cam-shaft (within convenient reach from the throttle wheel), by means of which the valves may be worked with the utmost ease. The only unbalanced pressure upon the valves is an area of less than one square inch on top, for the purpose of closing the valve quickly. A careful inspection of several indicator diagrams, taken under varying circumstances of load, pressure, &c., shows that this engine is capable of giving very excellent results, the several points which demonstrate the proper performance of the different functions showing a high degree of perfection. It was the intention, in noticing the various engines exhibited, to give with each the actual results of power developed and steam consumed under average circumstances, as shown by the indicator, which—when a good instrument is used—is considered by engineers to give positively reliable data, and is the best means of determining the comparative merits of steam engines. Unfortunately, however, the quality of steam supplied to all the engines in operation, both in Machinery Hall and elsewhere in the Centennial grounds, is so poor in regard to pressure and saturation, that the idea was abandoned as impracticable. In many instances, where the cards have been worked up, the evaporation per horse-power reached as high as 30 per cent. above results before obtained from the same engines under average conditions. It is, therefore, obvious that it would be an act of injustice toward exhibitors to give the performance of their engines under conditions which would show them in their worst light, and which would never be realized in their practical use.

THE BUCKEYE ENGINE COMPANY,

of Salem, Ohio, exhibit a 16 by 32 inch horizontal engine of the variable type, beside three others which may be classed as adjustable—all of which are in operation in Machinery Hall and its annexes. The principal exhibit of the company, including the engine at present under consideration is located on space D 9, col. 70, Machinery Hall, and is a fair sample of the work turned out from their shops. The variable engine is of the "Corliss" style of housing, and has Thompson's automatic cut-off, which is built exclusively by the company, and is a decided novelty as regards the regulator or governor, as well as in most respects the valves also. The radical difference in the action of the latter from the ordinary form of slide valve admits of dispensing with the central exhaust port, and consequently of the necessity for the S cored passages to the cylinder, thus reducing the length of the passages to the thickness of the cylinder, and effecting a saving of about 50 per cent. of the clearance ordinarily allowed. The valve seat is of the full length of the cylinder inside of flanges, the steam ports being cut straight through to the interior of the cylinder in a line with the heads. The main valve embodies the novel feature of admitting the steam from the interior cavity through the necessary ports and exhausting into the steam chest (the term is a misnomer as applied in this instance, but is used on account of its designating more readily than another the part referred to), the cover of which may be left off while the engine is running. As the steam pressure acts upon all sides alike the valve is perfectly balanced, a feature which from its importance is a desideratum with engineers, and has been the occasion of many unsuccessful attempts to accomplish in a manner sufficiently devoid of objectionable features to render it of practical utility. Inside of the main valve is the seat for the independent cut-off valve, the stem of which passes through the entire length of that of the former. The main valve is operated by a single arm rocker, which receives motion from a fixed eccentric on the main shaft, having the throw and adjustment necessary to give the required travel, lead, etc., to the valve. The cut-off valve is both actuated and regulated by a loose eccentric (whose position in relation to the crank is under control of the governor), and to compensate for the motion of its seat in the main valve the intervention of a two arm rocker is adopted, having its fulcrum in the middle of the rocker of the main valve. This device entirely neutralizes the effect of the motion of the main valve in relation to the cut-off valve, giving in effect a valve working on a stationary seat. The governor is contained by a flanged disc made in halves and bolted together on the main shaft, and consists of two opposite vibrating arms pivoted at the ends toward the direction of rotation, and carrying weights to give the proper amount of centrifugal force. About one-third the length from the fulcrum is attached a stout spiral spring, the tension of which is adjustable by means of screws, to give the necessary amount of resistance to the centrifugal action of the weights incident to the desired speed. At the free ends of the levers are rods which connect them with opposite lugs on the loose eccentric, thus transmitting to the latter all variations in position of the levers caused by increase or decrease of speed. The action of the cut-off is very simple and may be described in a few words, as follows: As the speed of the engine increases, the tendency of the weighted levers, owing to the position of their fulcrums, is to move outward toward the periphery of the disc in the direction of rotation. This is resisted by the springs until the limit of speed for which the springs are adjusted is passed, when they move out quickly and simultaneously, thereby turning ahead the eccentric, and promptly shortening the cut-off until the speed is reduced to the proper point, when the eccentric is again returned to its original position. The quick action of the levers in turning the eccentric renders this form of governor very sensitive, and enables the engine to be kept at a uniform speed even under severe changes of load; while the consumption of steam as shown by the indicator, is exceedingly small in proportion to developed power, showing this engine to be one of the most economical in use. The other engines exhibited by this company will be mentioned in their proper class as soon as reached.

Brilliant Zinc Coating on Brass and Copper.—The following simple process is recommended by Bottger: Boil a large excess of so-called zinc dust some time, with a concentrated solution of caustic soda, or potash, and place the copper or brass articles to be coated in the boiling liquid. By continuing the heating, after a few minutes a beautiful, mirror-like film of zinc will form upon them, by the decomposition of the alkaline solution, in consequence of their electro-negative character in combination with the zinc. It is suggested that the process is applicable to the preparation of disks for dry-piles, and also for forming a layer of tombac, by heating a copper article thus coated, carefully, to about 248° to 284° (best under olive oil), when the zinc will unite with the copper support to form a gold-tinted tombac, and the article need only be quickly cooled in water, or some other suitable liquid, as soon as the desired color is apparent.

American Institute Fair.

It seems that the American Institute Fair for the present year is to be one of exceptional interest, if the expectations of the managers are to be realized. Opening the present week, it is not to be closed until the 11th of November, or, perhaps, a week later. We note the fact that the usual insane classification of exhibits is retained. There are usually about 1000 exhibitors, and, although the exact number for this year is not known, it is fully up to the average. More applications for space have been received than can be granted. High grades of goods have been sent, and the class of exhibitors is better than usual. The Centennial Exhibition has stirred up a feeling of emulation among manufacturers, many of whom have never exhibited before, and the great dullness of trade has not only made them anxious to draw the attention of the public to their goods, but has given them the time to prepare their wares and bring them to the Institute Fair. The exhibition this year will be particularly interesting on account of a number of unusual features. One of these will be silk weaving on Jacquard looms like those at the Centennial Exhibition, which are not often shown in public. All styles of fancy weaving will be done and ribbons made of many patterns. Another feature will be a large display of American china, glassware and pottery of all kinds. The exhibit of musical instruments, such as pianos and organs, will also be much larger than in former years. There will be no display of foreign goods to any extent, except of Japanese wares. The Japanese department in Philadelphia being so attractive to visitors, the managers in New York have given Monotaro Sato permission to erect a Japanese house and bazaar in this Fair on the north side of the hall, where there will be a large and varied exhibit of wares, goods and curiosities of all kinds brought from Japan. Native attendants will be in charge of this exhibition.

The Centennial Exposition will assist, rather than interfere with, the success of the Fair in this city. The International Exhibition has encouraged the taste for expositions and aroused exhibitors to activity. The only deficiency in the Institute Fair will be in the department of heavy machinery. The very large machines used in shops are the most expensive articles to exhibit, the cost of moving them and putting them up being very great, and few of those who are displaying such works in Machinery Hall, Philadelphia, care to be at the expense of two exhibitions. There will, in consequence, be a scarcity of very large machines at the Fair, though there will be an extensive and excellent display of light machinery. There has generally been considerable delay in arranging goods at the fairs of the Institute, keeping the place in disorder and making the attendance small for the first two weeks. The managers hope to avoid this on this occasion, and as there is a large demand for space from those to whom none is allotted, the managers are thinking of giving to those waiting the space of all who do not occupy their places within 24 hours of the opening of the exhibition.

Dog Power.

Few things are more amusing than old advertisements. They show the condition of the arts and industries, of business, travel, social conditions, &c., far more accurately than any other form of record, and from the advertisements of a general newspaper, one can get a better idea of the civilization of a country or town than can be had from books. We are reminded of this, in these days of cheap motors, by the following advertisement, which was printed in the New York *Commercial Advertiser* of June 10, 1818:

THE INTELLIGENCE AND ACTIVITY OF THE DOG CONVERTED INTO A POWER FOR A VARIETY OF USEFUL PURPOSES.

The subscriber having obtained Letter Patent for the application of the Agency of Dogs, as a new power for various useful purposes, is ready to sell Patent Rights, for the application of his principle, to such as the following purposes:

For pumping water; irrigating meadows, gardens, etc.; grinding paint, corn, bark and other articles; turning the grindstone, the lathe, carding and spinning machines, and washing machines; working churns; assisting rope makers; thrashing and cleaning grain; cutting straw, tobacco, shingles, dye wood; chopping meat, etc.; and for a great variety of other purposes where the employment of canine agency will prove highly economical and profitable. The requisite machinery is simple, and constructed with little expense. The Patent Right will be sold at a very low rate. Able dogs can easily be procured and trained for this object. The subscribers have had several employed in this manner for some years, and they have invariably been healthy and robust, and apparently delighted with their employment. The advantages of this principle and its multifarious adaptation are obvious. By these means a very interesting portion of the animal creation, hitherto more or less prescribed, is thus made subservient to the most useful operations. One dog will labor to more advantage than two men. The saving of labor and expense is extraordinarily great. Several machines of this kind are already in operation in this city and neighborhood.

Persons desirous to convince themselves of the efficacy of canine efficiency, applied as before stated, and those who wish to purchase the privilege of using this valuable improvement, are respectfully invited to call on

ANTHONY TIEMANN.

Mr. Anthony Tiemann doubtless made a valuable discovery in mechanics when he found that the attraction of gravitation acting upon a dog could be mechanically utilized and converted into power, but it was rather a funny thing to patent. Unfortunately for the dogs, we can now dispense with their services, and the delight they were wont to feel and express at their occupation is now denied them. They manage to get along very well, however, without working for their living.

USE THE BEST.

Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

THE BEST IS THE CHEAPEST.

McCaffrey's Standard American Hand Cut Files and Rasps are warranted to do more work than any other files and rasps in the market.

SILVER MEDAL TRADE MARK. HIGHEST PREMIUM.

PENNSYLVANIA FILE WORKS.

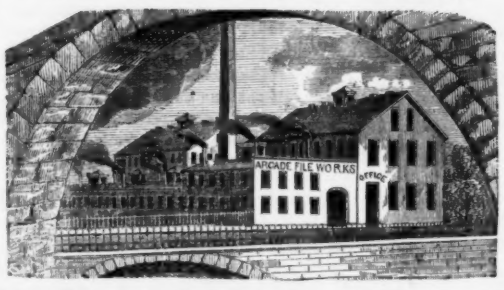
McCAFFREY & BRO.,

No. 1732, 1734 & 1736 North Fourth St., Phila.

Messrs. ARNOLD & CO., 310 California St., San Francisco. Sole Agents for the Pacific Coast.

ESTABLISHED 1848.

C. T. DRAPER & CO. Sing Sing, N. Y. Manufacturers of SUPERIOR HAND CUT



FILES and RASPS Made from Best ENGLISH CAST STEEL. Quality guaranteed by written warranty when required.

AUBURN FILE WORKS,

Superior Hand-Cut

FILES AND RASPS,

MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.

FULLER BROS., Sole Agents,

89 Chambers and 71 Reade Streets, N. Y

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WEST CHELMSFORD, MASS.,

MANUFACTURERS OF EVERY DESCRIPTION

—OF—

FILES and RASPS.

Alfred Field & Co.,

93 Chambers & 75 Reade Sts.,

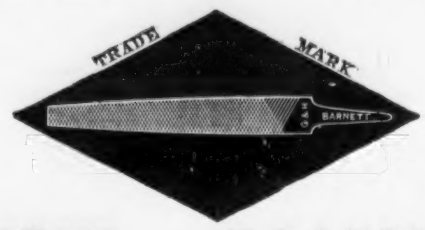
NEW YORK CITY,

GENERAL AGENTS.

All Goods Warranted.

Black Diamond File Works.

Send for Illustrated Price List.



Send for Illustrated Price List.

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LINFORTH, KELLOGG & CO.,

Sole Agents for the Pacific Coast, 3 & 5 Front St., San Francisco, Cal.

St. Louis, Mo., SEMPLE, BIRGE & CO., Agents.

THOS. TAYLOR, 43 Chambers St., N. Y., Agent for N. Y. and N. E. States.

Established 1816.

Peter A. Frasse & Co.,

95 Fulton Street, New York,

SOLE AGENTS FOR

Thomas Turner & Co.'s Suffolk Works,

SHEFFIELD.

FILES AND HORSE RASPS,

And Importers of

P. S. STUBS' FILES, TOOLS & STEEL,

W. J. Davies' Sons' London Emery Cloth,

HUBERT'S FRENCH EMERY PAPER.

ELIAS G. HELLER. PETER J. HELLER. GEO. E. HELLER. JOHN J. HELLER.

HELLER & BROS. NEWARK, N.J. TRADE MARK

We invite the attention of the trade to our **Celebrated American**

Horse Rasps and Files,

made from the very best American Steel, all cut by hand, and warranted to give entire satisfaction. If requested, we will send sample lots, to be returned or held subject to our order, free of all charges, if not found as represented. All Rasps not stamped as the annexed incorporated trade mark are not genuine. Sold by Hardware dealers generally.

Established 1868.

FILES & RASPS,

Best Cast Steel. HAND-CUT. Manufactured by

JOHNSON & BRO.

No. 1 Commercial Street, Newark, N. J.

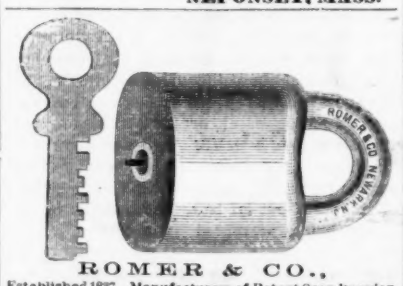
Putnam's Government Standard FORGED Hammer Pointed HORSE SHOE NAILS,

READY FOR DRIVING.

Manufactured from the best of **NORWAY** Iron, and warranted to give entire satisfaction.

S. S. PUTNAM & CO.,

NEPONSET, MASS.



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Established 1837. Manufacturers of Patent Scandinavian or Jail Locks. Brass Pad Locks for Railroads and Switches. Also, Patent Stationary R. R. Car Door Locks. Patent Piano and Sewing Machine Locks. 141 to 145 Railroad Avenue, NEWARK, N. J. Illustrated Catalogue sent on application.

THOS. JOWITT & SONS, SHEFFIELD,

Manufacturers of every description of

FILES.

Forged, Ground and Cut by Hand and Tempered by an Improved Process.

Manufacturers of

CAST, SHEAR & BLISTER **STEEL**

For various purposes.

CORPORATE MARK

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Importers of

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Granted according to Act of Parliament, and Registered in Germany and the United States.

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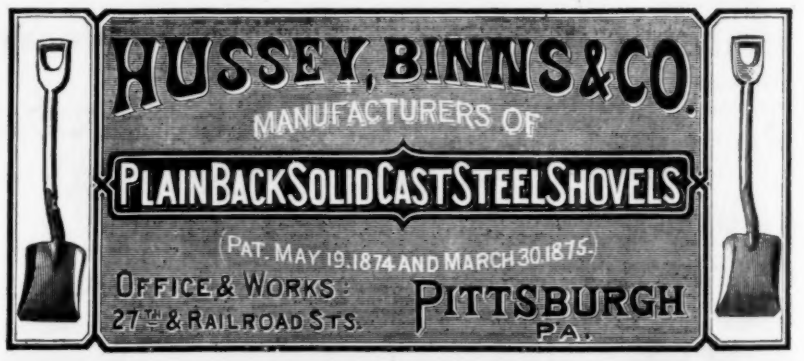
CHARLES B. PAUL,

Manufacturer of HAND-CUT **FILES.** Warranted CAST STEEL.

187 Tenth Street, Williamsburgh, New York.

All descriptions of Files made to order. Price List mailed on application. **Established 1863**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MANUFACTURERS OF
PLAIN BACK SOLID CAST STEEL SHOVELS
(PAT. MAY 19. 1874 AND MARCH 30. 1875.)
OFFICE & WORKS: 27TH & RAILROAD STS.
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OLD COLONY IRON CO.,

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MANUFACTURE

Nails, Shovels, Spades, Scoops, &c.

SOLID CAST STEEL GOODS MADE TO ORDER.

Warehouse, 211 Pearl St., N. Y.

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Middleboro' Shovel Co.,

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Hoisting Machinery
Manufactured by
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Our New Illustrated Catalogue and Price List of
SCALES
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SPRING BALANCES,
is now Ready and will be sent to the trade, on application to
John Chatillon & Sons,
91 & 93 Cliff St.,
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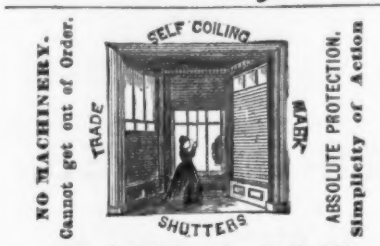

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Self-Coiling, Revolving
NOISELESS
STEEL SHUTTERS
FOR
Store Fronts & Rear Windows.
FIRE AND BURGLAR PROOF.
Also, SELF-COILING
Wood Shutters
In various kinds of wood, suitable for Store Fronts, Private Houses, Offices, and School Partitions.
The Best & Cheapest Shutters in the World.
All Real Estate owners are invited to inspect them at the factory,
162 & 164 West 27th Street, New York.
And at London, Paris, Vienna, Melbourne, &c.

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MATCH SAFE.
Exposing one match at a time.
Plain, $30 per gross.
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Agents wanted in every county throughout the State.
PRICE EVANS,
Sole Owner of Patent,
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Order the "BEST."
1,000,000 CHANGES.

Full Size of Store Door Key.

The Celebrated Improved
SHEPARDSON LOCKS.
On security, durability, beauty and easy application we challenge competition. They are the "best" in the world.
Manufactured only by
The United States Lock Co.,
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EUREKA
Patent Coffee and Tea Urns and Pots.
The best Urns and Pots in the market. Coffee made in three minutes without boiling. Entirely free from tannic acid, saves all the aroma. Send for circular. 26 Cliff Street, N. Y.
For Sale at all house furnishing stores.

TRANSFER ORNAMENTS
For Tin, Japan Ware, Safe and Carriage Manufacturers, Etc. For sale by
JULIUS FECHTELER, 104 John St., N. Y.
sell my Carriage Ornaments to dealers only.

THE DOUGLASS MFG. CO.,
New York Warehouse, 62 Reade Street. P. O. Box 2610.
FACTORIES, Seymour, Conn.
MANUFACTURERS OF
COOKS' BORING IMPLEMENTS.

These goods have been in use over twenty years. We have reduced our List Price of Cook's Augers and Bits. Discounts remain unchanged.

Chisels, Gouges and Drawing Knives of all kinds, Screw Drivers, Screw Driver Bits, Cook's and Douglass Mfg. Co.'s Augers & Bits, Wood and Metal Head Gimlets, Improved Hollow Augers, Blake's Patent Extension Bits,
Boring Machines, Chisel Handles, Wood Boxes, Tool Chests.
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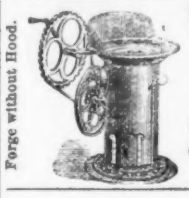
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THE HURRICANE FORGE.
(PATTERSON'S PATENT.)
Also Stationary Forges.
Large Size, superior to stone or brick. Can be used with bellows or fan. Send for prices and further information to
GEORGE PLACE, General Agent,
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AUSABLE HORSE NAILS
POLISHED OR BLUED.
HAMMERED AND FINISHED

The Ausable Nails
Are Hammered Hot,
And the Finishing and Pointing are Done Cold,
Thus Imitating the Process of Making Nails by Hand.
Quality is **Fully Guaranteed.**
For Sale by all Leading Iron and Hardware Houses.
ABRAHAM BUSSING, Secretary,
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MIDVALE STEEL WORKS.
Works and Office, NICETOWN, PHILADELPHIA, PA.
MANUFACTURERS OF
CRUCIBLE AND OPEN HEARTH STEEL,
Steel Locomotive Tires. Steel Axles of every description.
STEEL FORGINGS UP TO 8000 lbs. IN WEIGHT.
Solid Steel Castings, Hammer Dies, Frogs, Crossings, etc.
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The only **GENUINE D. R. BARTON** Tools,
ARE MADE BY
THE D. R. BARTON TOOL CO.,
Cor. Mill and Furnace Streets, ROCHESTER, N. Y.
AGENCIES:
HEATON & DENCKLA, - 507 Commerce Street, Philadelphia, Pa.
H. O. STRATTON, - - 33 Oliver Street, Boston, Mass.

The Acme Pipe Cutter.

We show in the accompanying cut the Acme pipe cutter manufactured by Messrs. Pancoast & Maule, of Philadelphia. It is made of cast steel throughout, and is used for cutting off wrought iron, brass or copper pipes, rod iron, &c. It is shown in the Centennial at Col. 75, Sec. D 10, Machinery Hall, with samples of its work. These samples cover a very extensive range of materials, from ordinary wrought iron gas pipe to cold rolled shafting, copper rod and very thin brass pipes, the cutting of which, the inventors claim, cannot be accomplished by any other hand tool now existing. The following are a few of the advantages claimed for the Acme cutter:

It is made throughout of solid cast steel thoroughly hardened, increasing the durability beyond the possibilities of any case hardened or chilled iron tool, while the superior strength of the steel and accurate manner in which it is fitted, admit of its being much lighter. It is adapted to widely varying classes of work, and will be found to operate equally well on wrought iron gas and steam pipes, boiler tubes, oil well tubes, round iron, bolts, shafting, brass and copper pipes, &c.

It is, as claimed, an actual cutter, and does not depend on force of pressure to indent the pipe until it can be broken off; but cuts out a regular chip precisely similar to the action of a lathe tool, leaving the end of pipe perfectly square and true, entirely devoid of any burring inside or outside, and ready for the die without being touched with a file.

The fact that it does not depend upon force to perform its work, removes any liability to crush or reduce the diameter of the pipe, and renders it specially valuable in recutting old

material when the ordinary tools could not be employed to advantage.

The absence of any loose pieces so liable to be dropped out or mislaid, and the ease with which the knife may be withdrawn and reground, together with the trifling cost of renewing it, renders it easy at all times to have the tool in good working order; the most an inexperienced hand can do is to chip off the point of the knife, an accident which a few moments serves to correct, and which does not permanently impair the efficiency of the tool.

The knives are of such simple construction that any blacksmith can replace them; this will often be found an advantage by mechanics working at a distance from their shops, when delays are often unavoidable. Most pipe cutters after a time become so indented by friction of the pipe that it is almost impossible to cut straight with them, and as this cannot be obviated the[f] must be replaced by new tools. When the jaws of the Acme cutter become worn they may be softened and trued up, and then rehardened, when the tool will be found to operate equal to a new one. All parts are made interchangeable, so that they can be promptly renewed when required.

An Improved Catalan Forge.

A writer in the Plattsburgh (N. Y.) *Republican* describes as follows an improved Catalan forge, built at Saranac, by Mr. Edgar Peckham:

Adjoining two ordinary forge fires at the rear is a brick structure 18 feet high, 11 feet deep and the width of both fires including the space between them. The interior space of this brick structure is occupied by 12 air-tight retorts, each 11 feet long, 3 feet high and 11 inches wide, and each holding a ton of ore. They are constructed of the best fire brick, tongued and grooved and laid in fire clay. These retorts are arranged in four tiers, three one above the other in each tier, and surrounded by a series of fire flues, also of fire brick, connected with the forge fire below and a single smoke stack above. The ore as it comes from the separator is mixed with an equal bulk of fine waste charcoal (*braze*) and piled upon the top of the retorts, then a slide is drawn, opening a row of holes in the top of the upper retort and the ore and braze runs in, filling it. Here it remains 12 hours, subjected to a dull red heat, very small crevices being left open to allow the escape of steam from moisture and gases. After 12 hours another slide is drawn covering a similar row of openings connecting this with the second retort directly underneath, and the ore runs down into the next retort below, while the upper one is filled as before with fresh ore from above. In the second retort the ore remains 12 hours subjected to a little higher temperature when it is let down into the third one by means of another slide which, like the others, fits tightly, where it remains 12 hours more at a bright red heat, when it is run into an oven underneath, which is tight, with the exception of an opening in front, before which a sheet of flame from the forge fire is constantly ascending in its passage to the flues above. From this oven it is hauled out by the bloomer as he needs it, falling upon the forge fire, when it is readily reduced, and forming a loop which is then drawn as usual under the hammer. Thus the ore is subjected to a red heat for 36 hours in air-tight retorts, together with pure carbon, and it is claimed that this process results in the thorough deoxidizing of the ore, which is just the necessary preliminary chemical process desirable for making the best quality of iron at the least possible expense. It will be seen that no extra heat is required above that of the ordinary forge fire—in fact, not as much—for the ore, being already red-hot when it falls upon the fire, must, of course, melt with less heat that if it went on cold as in the ordinary method. So much for the process, now for the results. It has been aptly said that one practical result is worth a bushel of theories, and it is undoubtedly true that theories which are not corroborated and proved by actual tests are worth but little. What, then, is the advantage of all this labor and expense? We are happy to say that the results seem to be most satisfactory—so much so that it requires but a little stretch of the imagination to see in them foreshadowings of a great revolution in the process of iron manufacture by the Catalan forge process. The iron turned out here is being used exclusively by a single firm in Massachusetts in the manufacture of boiler rivets. This requires the finest quality of iron, and the proprietors have never been able, hitherto, to find any American iron which would answer their purpose, but we saw a certificate from them in which they say that this iron answers their purpose fully as well as the Swedish and Norway iron, which they have formerly used exclusively. There is a fact which is not only worth a bushel of uncorroborated theories, but goes far to prove the truth of the theory in question. Every loop of this iron is thoroughly tested, and these are afterward assorted in three qualities—numbers one, two and three—before leaving the forge. This has the excellent effect of putting the bloomers upon their mettle, as three different grades of prices have also been established for the different qualities, and beside, it will have the result of weeding out "number three men" and filling their places with first-class workmen. These loops are not hammered down to a finished condition, but are left in a rough state. At the rolling mill they are reduced to ¾ inch bars at the *first heat*, and at the second are rolled into rivet rods. Those who are familiar with iron manufacture will understand that it is no ordinary quality of iron which can be reduced at one heat from a rough billet to a ¾ inch bar. Some of the iron has been manufactured into horse nails in the Dodge machines, at Keeseville, and the result is a nail which, according to the best judges, is fully equal if not superior to those made from the finest Norway iron. We saw a piece of this iron cut from the end of one of the loops, and hammered down on a blacksmith's anvil into a bar half an inch square, and when cold that bar was doubled over and over upon itself and hammered together under the blows of a heavy sledge hammer without showing the least sign of cracking or breaking of its texture. A piece of iron from another loop was hammered out into a flat plate ⅛ of an inch thick, and then doubled over cold and hammered down solidly without any sign of cracking; and another half-inch square bar was heated to a white heat and plunged into cold water, after which it was doubled together cold under heavy blows and showed no signs of cracking. Iron men do not need to be told that such results as these have never before been matched in the average products of the Catalan forge; and they are not due to chance, either, for any portion of any one of these number one loops will bear just such tests. Two more forge fires are being erected, with furnaces and retorts attached. The process has been patented by Mr. Peckham, the main principle involved being the heating of the ore in air-tight retorts at different temperatures in the presence of carbon, and the fact that the fine particles of charcoal come out unchanged after being subjected to a red heat for 36 hours is the best possible indication of the perfection which has been attained in the construction of the furnaces, retorts, &c.

No less than 13 shapes of fire brick are used in the manufacture of the retorts, in order to give them the right form and requisite degree of strength, and the greatest care is used in the construction of every portion of the works.

One advantage, which is no slight one, is that the consumption of coal is very materially lessened by the process, and this would abundantly pay for the extra outlay, even if the quality of iron was not improved. The blast is reduced from 2½ to 1¾ pounds pressure to the inch, and even with this reduction considerably more iron is made in a given time from each fire than by the ordinary method.

We have only imperfectly described this new process in iron making. What the ultimate results will be, only time can tell, but as it looks now an important point has been reached in the history of the Catalan forge, which practically has an existence in this country only in northern New York. Of one thing our iron makers are becoming painfully aware, and that is, the ordinary products of the Catalan forge are becoming more and more a drug in the market, for the reason that a purer quality of iron can be produced at a cheaper rate by the blast furnace and puddling process. The result at which all iron men are aiming is to produce pure iron—which is the same the world over—at the cheapest possible rate. It must be confessed it looks reasonable that this result can be the best accomplished by getting rid of impurities from the ore before reducing it, instead of combining them more firmly than ever with the iron by melting the whole mass down together into either a pasty or liquid state, and we apprehend that in less than ten years, practical iron men will unite in wondering how they could have remained so long blind to so simple a fact as that involved here.

If this process proves to be what it promises, it will be a blessing to Northern New York, for it will enable our iron makers to produce comparatively pure iron at a less cost than they are now producing a crude article which is a drug in the market.

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[Accompanying engraving represents the Springfield Bridge, built by the Leighton Bridge and Iron Works.]

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Trial of the Improved Lightning Saw.

THE EMPEROR, DOM PEDRO, accompanied by Director-General Goshorn, Superintendent Albert and others, visited Machinery Hall, at the Centennial, on the evening of June 28th. Among other things inspected, at the invitation of E. M. Boynton, of New York, they witnessed a trial of the new Lightning Saw, patented March 26, 1876. Two men with one of these saws cut off a sound log of gum wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corliss, Morell, Lynch and other members of the commission witnessed the trial and timed the cutting. The Emperor remarked that was fast, very fast cutting. Last evening the Emperor made another examination of the saw.—*Philadelphia Press*, June 30.

BOYNTON'S Saws were effectually tested before the Judges at the Philadelphia Fair, July 6th and 7th. An ash log 11 inches in diameter was sawed off, with a four-and a half foot Lightning cross saw, by two men, in precisely six seconds, as timed by the chairman of the Centennial Judges of class 15. The speed is unprecedented, and would cut a cord of wood in four minutes. The Representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries were present, and expressed their high appreciation.

Any Dealer is aware that in an ordinary Hand Saw, the front cut is the effective cut, and drawing back the saw has little effect by reason of the slant edges riding over the fibre, as the Saw is drawn back. The difference between the front cut of a Hand Saw, and the back cut, is the difference between the Lightning Saw teeth and all others; for all other saws are set one point and ride on slant edges. By setting two points of my M the same side and the next two the other, I conceal the slant between them, and operate wholly by the oustide of a nearly vertical M tooth. Standing nearly vertical the two points of the M occupy the same space as the old V tooth. One point only is cutting and the other follows in the slit behind it to cut in the same manner, in the return motion, thus doubling the cut upon the same base and space of tooth. This construction also gives the breadth and durability of nearly an inch of steel instead of a single slender scraping point, and presents the upright instead of the slant edges to the timber. Any one can in a moment test the principle by comparing the front and back cut of any V tooth Hand Saw. My new patent of March 28th, 1876, allows the saw-dust perfect clearance; the arch slightly widening to the points of teeth renders it impossible for green or resinous saw-dust to be retained, while the slightly increased breadth at base of tooth gives the durability so much advocated by parties who have round-edged files for sale. Slightly pyramidal, the outer edges are as upright as the front cut of a Hand Saw, and the back slant cut is concealed in no other Saw than mine, by setting the two points of M to cut in line instead of alternately. Thus by this new Patent I avoid all "overhang or under-cut," avoid all tearing, and to the matchless speed of the Lightning dress and set, add the durability, simplicity of sharpening, and sweet cutting so much admired. I thus adapt the Lightning teeth to universal use, in all Hand, Pruning, Buck, and Cross-Cut Saws. The concave in the centre of the M saves files, and renders it impossible to file the tooth out of shape. ☞ A 10-inch Cant File and Set fitting the M is furnished for forty cents, that will file ten saws easily.

☞ A 16-inch log was sawed off in 17 seconds by hand with a Lightning Cross-Cut Saw, at Pennsylvania State Fair, on September 30th, 1874, before President Eby; W. B. Lawson, S. S. Hoagland, and other officers of the State Board, timing.

$1000 challenge to any responsible saw manufacturer, to match the Lightning saws in speed of cutting and ease of sharpening. This patent saw tooth has recently been vindicated by U. S. Court decreeing costs and damages for infringements. Beware! ☞ POOR GOODS ARE NEVER IMITATED.

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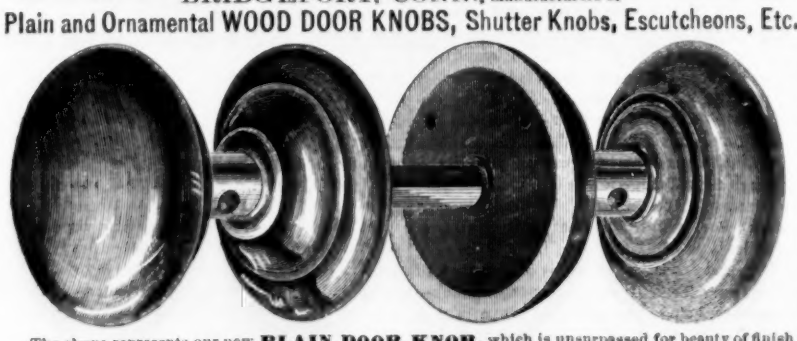

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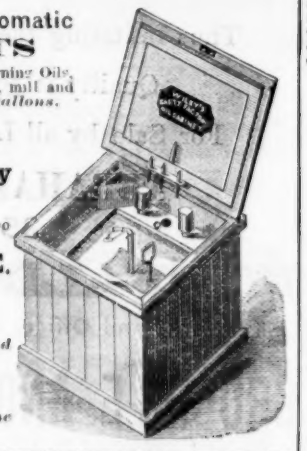

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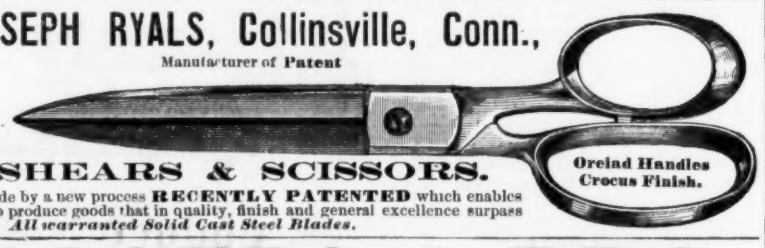

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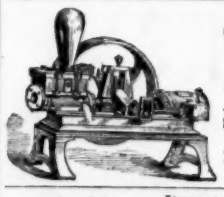
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On Certain Principles of Iron Construction.

BY T. C. CLARKE, ASSOCIATE.*

One of the marked characteristics of modern civilization is division of labor. This has extended from the crafts to the professions—law, medicine, and that profession of scientific construction now divided into architecture and engineering.

Engineering is found to be a field too vast for any one man to cover; and specialties have arisen, forming distinct branches, such as hydraulic, railroad and mining engineering. Within the last few years another specialty, that of iron construction, has engrossed the attention of some able minds, and its progress and improvement have been very great.

It would be too much to expect of an architect that, in addition to his own practice, he should become an expert in iron construction; and it would not be in accordance with the spirit of the age that he should devote the time and attention that would be necessary which he might better employ in his own special calling. Nevertheless, it becomes every day more and more necessary that he should grasp and thoroughly comprehend certain general principles which govern construction in iron, which, if he does not understand and follow, he will increase the cost of his roofs and other iron structures.

1. The economic object to be aimed at is that all parts of an iron structure shall be of uniform strength. An iron bridge or roof, like an iron chain, is no stronger than its weakest part. All iron in excess of this is superfluous, economically speaking. This is theoretically simple, but practically difficult to attain.

2. The weight of an iron roof or girder increases directly as the load to be carried, and inversely as the leverage. This leads to very important results. The strain upon the rafters and ties of a roof, and upon the upper and lower flanges of a girder, diminishes with the hight or depth of that roof or girder. But, as the length of the rafters and intermediate bracing increases with the hight, there must be an economic limit of hight somewhere. This is found to be in roofs at one-quarter of their pitch or span, and in girders at from one-eighth to one-tenth of their span. For special reasons it may be necessary to make a roof higher or lower than quarter pitch, but in such cases it will take more iron to carry equal loads. For less hights than one-quarter pitch, the extra quantity of iron increases in a much faster ratio than it does when the hight is greater than quarter-pitch. The same rule applies to girders, and it should be observed that a shallow girder not only takes more material to give equal strength with a deep one, but it is never so stiff, and will deflect more, just as a 4"x12" stick set on edge is stiffer than a 6"x8" stick.

3. It is not economical practice to carry one girder or set of girders by another. All supporting members should bear directly on the walls, if possible. If this cannot be done, the main girders should be arranged so as to give as short spans as possible to the beams which they carry.

The application of this rule to roof construction shows some remarkable results. If the principal trusses of a roof are placed 15 feet apart, every purlin is a girder of 15 feet span, and must be proportioned accordingly. But, if the principal trusses are placed 30 feet apart, the purlins have to be treated as girders of 30 feet span; and, owing to the law of leverage, the weight of iron in a girder increases not directly, but as the square of the span. Hence the 30 feet purlins will weigh four times as much as the 15 feet do, and four times as much iron will be required in the principal trusses to carry them; and, as they are double the distance apart of the others, it will take just double the amount of iron in the roof. The greater amount of labor required to make the principal trusses, over that in the purlins, fixes practically the economic distance of the trusses at from 12 to 15 feet apart. Other considerations may render greater distances desirable, but it will be at the expense of more iron.

In desinging floors of rolled iron beams, the deeper the beams the less iron will be required to support a given weight; that is to say, if they are placed at such distances apart, that the strain per square inch on their flanges is the same.

For example, a room 50 feet long and 21 feet wide may be spanned with equal strength as follows: Twelve 10⅝ inch beams 4 feet 2 inches apart, weighing 10,100 lbs.; ten 12 inch beams 5 feet apart, weighing 9300 lbs.; five 15 inch beams 10 feet apart, weighing 7000 lbs.; so that the last arrangement costs the least. At present we know of no way of lightly and economically filling 10 feet spaces between beams.

The cost of fire-proof construction might be considerably diminished if greater depth could be given to the floors of buildings. It has been found that the most economical depth for a riveted beam built up of plates and angles is about one-tenth of its span. Rolled iron beams, such as are generally applied in fire-proof floors, are used about one-thirtieth of their span, and consequently take nearly three times as much iron as if they were made at their economical depth.

The most economical construction would be one of built beams, of a depth of not less than one-tenth of their span, placed at wide distances apart, and united by some light and strong system of arched work, such as buckle plates covered with concrete.

It should also be remembered that a beam loses a great portion of its strength (in some instances amounting to even half) unless it is prevented from springing sideways.

4. The most economical shape of roof that carries nothing but itself is an arch formed of a segment of a circle, and prevented from changing form by the tie-rods radiating from the center of the chord of the arc. But as roofs of large span are generally required to carry dormers, ventilators, &c., the best form for such purpose is the ordinary trussed rafter roof.

The amount of iron in the main tie of a roof is increased by raising it above the horizontal line in the ratio of the secant of the angle of elevation above the horizontal.

An arched roof, like those of the New York Central, Boston and Providence, and Boston and Lowell Railway stations, requires no more iron than a trussed roof of similar span resting on iron columns; but the cost of workmanship is rather greater.

5. Cast and wrought iron columns are often criticised by architects as not satisfying the eye on account of their slightness; and they are sometimes made large enough to support the required load, and then covered up with an outer casing designed for ornament alone. A little investigation will show us that this is not the true treatment of iron columns. A column whose length is over ten or twelve diameters fails by bending sideways like a beam under its load. Hence the strongest shape is a hollow circle where the material is equally distributed at the greatest distance from the center, as this gives the largest possible diameter in every direction.

Suppose that 28 square inches of section, in the shape of a solid round cast iron column, 18 feet long and 6 inches diameter, will carry a safe load of 70 tons.

By making that column hollow and 1 inch thick, the outside diameter will be 10 inches, the amount of metal will not be increased, and the safe load will now be 117 tons. Now, divide the same amount of metal into four hollow columns of 4 inches outside diameter each. Place them on the corners of a square of 16 to 18 inches diameter, and put in two rows of connections, bracing the four all together firmly, and dividing the 18 feet into three lengths of 6 feet each. They will now carry a safe load of 150 tons, and we have got back to the mediæval arrangement of clustered shafts, which is both constructively and æsthetically the correct treatment of iron columns.

There is no doubt but that the hammer-beam roofs of the fourteenth and fifteenth centuries, which are so justly admired, might be reproduced in iron, with a treatment adapted to that material, and be made of much vaster dimensions and with grander effect than their wooden predecessors.

We must not lose courage because our iron architecture has not perfected itself in the brief time during which the iron age has existed. In some shapes it has done so. Our iron suspension bridge is as perfect in its way as a stone spire; and it is possible to conceive of an iron spire, rising above the clouds like an arrow in its flight, and eclipsing the glories even of Strasbourg and Cologne.

* Read at the Eighth Annual Convention of the American Institute of Architects.

An Industrial Exhibition in New South Wales.

We have received the following letter, which is of interest to manufacturers seeking foreign markets:

PHILADELPHIA, Sept. 1, 1876.

To the Editor of The Iron Age:—SIR: Knowing the interest you have taken in the export trade of American hardware and machinery, I inclose you a circular and invitation from the New South Wales Commission at our Exhibition to attend their exhibition, with exhibits, in Sidney, April 10th, 1877. Your valuable paper having such a large circulation among manufacturers and others interested in the export trade, I unite with Mr. Chas. Robinson, Secretary of New South Wales, in the request to have you publish the inclosed invitation at an early date. In transmitting the inclosure to you, I cannot omit referring to my former letters on the Australian trade and resources, confirming my views of the value of an exchange trade with that country, and thereby finding an outlet for accumulated stock which the American manufacturers need so much. A casual observer looking over their exhibits in the Main Building, and then looking over their trade returns for 1874, must come to the conclusion that they have the ability to earn money and the will to spend it. Owing to the high rates of wages and the great scarcity of labor which have prevailed, as I understand, many of the mechanical appliances for which America has become celebrated ought there to find a ready market, especially such as would economize labor in the departments of agriculture and mining. The cordial invitation from our Australian friends to our manufacturers should be responded to in the same spirit and competition as they have responded to our call. The fine display of their products which has been brought here at a great expense of money and time in collecting the same, should be acknowledged by responding with a full assortment of American manufactured goods at their Metropolitan Exhibition. The Commissioners, as well as the merchants visiting our Exhibition, are anxious to enter into business relations with this country, believing that the accomplishment of an exchange trade would be beneficial to both concerned. I had many conversations with the people and Commissioners of that country relative to the geographical position of the Antipodes to the United States, and they all admit, being nearest to our shore, that a large portion of their trade might be turned into our channel by a well directed effort. The exhibition in New South Wales will be a good advertising medium for American manufacturers, and by introducing themselves in that country in this way, will not only bring their goods to the notice of the trade, but if properly attended to by agents understanding their business will repay their outlay in orders, and at the same time lay a base for future trade. In sending machinery and other goods, I would advise that they be selected from stock, so that they may be sold at the close of the exhibition. It will not be necessary to have each exhibit attended by an agent. A few active business men familiar with the general hardware trade and machinery can attend to a large number of exhibits. This is the mode very many of the foreign exhibitors have pursued at our Exhibition, at a very small expense to each.

Yours, respectfully,
CARL STEPHAN.

Mr. Stephan's address is N 68, American Department, or H 17, Canadian Department, Main Building, Centennial Exhibition. We understand that he will probably return with the New South Wales Commissioners in December, and that he will take charge of any American exhibits which may be intrusted to his care. Manufacturers contemplating the shipment of exhibits will be able to obtain all necessary particulars from Mr. Stephan, and learn from him what it will be most to their interest to send.

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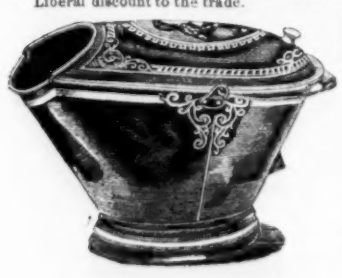

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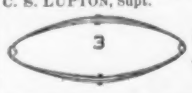

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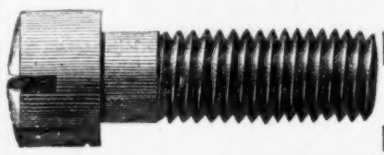

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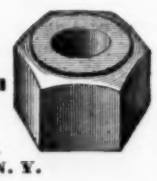

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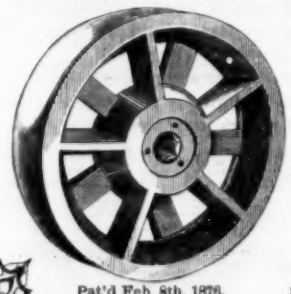

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Encouraging Indications of a Revival in Iron.

While we do not forget the admonition to "rejoice with trembling," if there be anything in signs we have a right to believe that the revival in the iron business has begun. These signs are first seen in the revival at Pittsburgh. The situation of that city in reference to coal, pig iron and a market is such that, as it was the last to give up work in the face of depression, it is the first to feel a revival, and the revival has come. Most of the rolling mills have started and are running full handed, with some orders and a prospect of continuance. This week two of the largest mills that have been in bankruptcy, viz., the Pittsburgh Bolt Works and Zug & Co. have resumed operations. All the steel mills are very fully employed, nearly all the glass houses are in operation or preparing to resume, and all through the city there are evidences of an activity that has been wanting for some months. It is true that prices are not at all satisfactory. The margin of profit is so close that at times it does not appear, but the significant fact is the demand, and with this demand must come an appreciation of prices.

A second sign is the effect of the reduction in the price of anthracite coal on the cost of foundry pig iron, as well as upon the cost of manufacturing iron in the rolling mills. How much this reduces the cost our readers can judge for themselves, and for their own locality. According to the figures of Mr. E. S. Baker, the average cost of coal per ton of anthracite pig was $7·21 in 1875, and in addition to this, to convert the pig into a ton of merchant iron required $8·14 of coal. The prices obtained at the recent coal sale in New York showed a reduction of over 50 per cent. on Reading Railroad coal, and of over 40 per cent. on Lackawanna. Whether the reduction on furnace and mill coal will be as great as this, we cannot tell, nor do we know if it will be long continued. We would incline to answer both of these questions in the negative; but for the present, at least, there will be a considerable reduction in this item, and as the cost of fuel, according to the same authority, is 30⅔ per cent of the cost of pig iron, exclusive of interest, and, allowing for this in the cost of the pig in a ton of merchant iron, the cost of fuel is nearly the same, 30 per cent. of the cost of a ton of merchant iron, also excluding interest. It is easily seen that a reduction in price of coal of even the smallest figure above given, would materially reduce the cost of a ton of merchant iron. The effect of this will be much more marked in the East than in the West, as fuel in the West has been at its lowest point, and the reduction in anthracite will have but little effect. Another sign is that consumption in some lines, at least, appears to have overtaken production. This is true of some grades of pig iron, of nails and other manufactures of iron.

In view of these facts and others that have been noticed in our columns, we do not hesitate to declare our belief that the long hoped for revival of business has begun. We do not believe that the indications will at present justify great hilarity, and do not advocate the tossing of hats and ringing of bells, but with renewed hope we look for the immediate re-establishment of confidence, and a better state of affairs.

Art Reproductions in Metal.

During something less than half a generation there has arisen a necessity for the ornamentation of a great variety of articles which were not previously considered susceptible of embellishment. When labor became so expensive and production was carried on so extensively that the masses of the people could not afford to pay the prices readily commanded for original art work in metals, decoration was practically abandoned, and the first fruits of the movement in the direction of cheapness and abundance were, as the rule, shapeless and practically devoid of ornament. Gradually, as public taste was educated to an appreciation of the fact that the combination of beauty with utility was possible in art, there was a demand for cheap ornament. To meet this demand manufacturers had recourse to various expedients to beautify their products; and as they started with false ideas, their effort to beautify with ornament was often carried to the ridiculous excess of overloading with decoration merely for its own sake, and without regard to appropriateness of design or harmony between it and the material in which it was wrought. This answered very well for a time, but only for a time. As the standard of public taste was raised, a higher order of art was demanded in metal work, and a gradual improvement in forms and decorations was noticeable. Public taste now demands still higher standards of artistic excellence in metal work, but the necessities of trade demand cheapness and a large production of whatever is made for sale to the great mass of consumers. This demand the enterprising manufacturer must meet by employing methods which will enable him to indefinitely reproduce good original art work at small cost, or to adapt for purposes of ornamentation good designs and appropriate devices borrowed from good work. Presuming that his taste is so far cultivated that he knows a good thing when he sees it, and can discriminate between that which is and is not appropriate for the use in which he would employ it, he is often met at the outset with the practical difficulty of cheaply and successfully reproducing art work in metals, which is not easily overcome. It is of the several methods by which such reproductions are possible, and their relative value as measured by the excellence of the results secured, that we shall speak in this article.

The art works which the modern manufacturer finds himself constantly called upon to reproduce, are those in which raised or sunken ornaments are placed upon plain or curved surfaces, or, in other words, carvings in high or low reliefs, or intaglios. The methods for producing works of this kind are various. First we have carving, which is commonly the method for producing the original. It is essentially a method for original work, and can rarely be applied to copying on an extensive scale. Most patterns for castings are wood carvings or their equivalents. Modeling may be considered another form of carving. It is essentially a method for producing originals and not copies—a method to be employed by the artist in composing, rather than by the manufacturer who must make in quantities. From time to time machine carving has been attempted, but, from the nature of the machines used and the rotary motion of the cutting tool, their utility has been limited to certain branches of art. The arts of carving and modeling ought to be much more extensively cultivated than they are at present, since it is by them that the artist first reaches a realization of his idea. We have often seen the curious phenomenon of an artist, whose work was to be in metal, putting his ideas into shape upon paper and leaving the rest to the pattern maker. He should, at least, have been able to give a sketch of his work in clay or wax and so have led the pattern maker, and produced a design instead of what was merely a suggestion to the one who had the real labor to do.

Of the mechanical methods of producing works of the kind named, we do not know whether casting or stamping is the older. We take it for granted, however, that stamping or its equivalent was first practiced. Under the head of stamping we will, for convenience, include work made from metal by hammering and by dies or swedges. Under these heads we have *repousse* work, in which figures are raised upon the surface of a sheet of metal by blows of the hammer from the back. This method was largely used in the olden time for the production of art work, and is now very largely employed by artists in metal for the production of great works. After the relief has been obtained by the hammer, the work is finished upon the face by appropriate tools. This process is manifestly unsuitable for the manufacturer who intends to reproduce. Stamping by means of dies has been largely used for reproduction. This process, however, has numberless faults. First, we have the great cost of the dies, which not only wear rapidly but break easily. In metal work, enormous pressure is needed to produce sharp impressions, and, on account of the limited ductility of the metals, the depth of the work must be limited, or else the articles to be operated upon must be annealed, and the final result attained by several set of dies of different degrees of depth. Artistic excellence by this method is impossible save in exceptional cases, and, at present, it is but sparingly employed. When combined with perforated work it is capable of producing very good results, especially in the shape of borderings. Some metals, like iron and zinc, can be worked hot, and are, of course, much more tractible than they would be otherwise. Even under such circumstances, however, fine work cannot be expected. The best, perhaps, which can be found, is the ornamentation of silverware by means of dies and presses. The depth of the impression in this case is exceedingly small.

Casting is, perhaps, more universally employed than any other for the production of art work. Sand, clay and metal are the materials generally used for the molds, the first being employed for iron and the more infusible metals, clay for bronze in some instances, and the metal molds for zinc, tin and the softer alloys. The great defect with this method seems to be the general carelessness of the foundry man, which is induced by excellence of the process and its cheapness. A certain general excellence of work is easily and at once attained, cheapness is kept in view, and the result is an abundance of work which, at first glance, appears admirable, but which, on closer examination, is utterly lacking in anything artistic or refined. The life and spirit are gone, the sharp touches are left out, hollows show a tendency toward filling, and a dead blank uniformity seems to have crept over the whole. Half a dozen coats of thick paint spread upon the original could hardly produce a worse effect, but in kind it would be very similar. Iron and soft metal castings show this to the greatest extent. Bronze from clay molds, cast under pressure, seems free from the fault. We have seen ordinary bronze castings in which this fault was but slightly perceptible.

Lastly, we come to galvano-plastic work, or electro-reproduction. This art is almost unknown in this country as an art, and even those who have heard of it know very little of its value. This is the most expensive of all the methods, but at the same time the most perfect. We know of but one establishment in the United States where any electro-reproduction, except ordinary electrotyping, is done. The reader must understand that we do not refer to electro-plating. This when applied to works of art constantly tends to the filling up of details. The method of electro-reproduction is to take an impression of the article to be copied in wax, gutta percha, or other suitable material, which is then coated with plumbago and placed in the battery. The deposition of the metal covers the interior of the mold with a thin shell of metal. In Europe this method is very largely used for art reproductions. Those of our readers who have had opportunity of visiting the Centennial and have seen Messrs. Elkington & Co.'s exhibit, have perhaps not known that the duplicate sets exhibited there, as well as some of the more important works, are reproductions by this method. An effort was made not long since to throw discredit upon this process for the production of fine work. When at Philadelphia we had an opportunity of examining, through the kindness of Messrs. Elkington & Co.'s representative, original *repousse* work and electrotype copies side by side. The difference between them was so slight that it was with difficulty that one could be distinguished from the other. The perfection of the copy is only dependent upon the sharpness of the impression in the wax, and, so far as the human eye can perceive, this can be made as sharp as the original. If it is not sharp the fault is alone with the workman and not with the process itself. For fine art reproductions this process has the very highest value, while at the same time it is by no means costly when the character of the work is considered. We have samples of this kind of work, capable of bearing microscopic examination.

In speaking of cast iron as a material and casting as a process, we gave it in general a bad character. It would perhaps be best to limit this to what is actually produced, rather than what can be done. Good castings, from an artistic point of view, require, primarily, a suitable subject. It is almost impossible to produce in cast iron a copy of *repousse* work which shall be anything more than a burlesque, and this applies to copying such work by any kind of casting. The nature of the work is such that, when a casting is made from it, the inevitable slight loss of sharpness spoils the work. Another thing must be kept in mind: a design which looks well in a light colored metal like silver, nickel, or tin, is likely to become heavy, dull and uninteresting when reproduced in a black metal like iron. The design must be suited to the metal or the effect will not be good. We do not know a better example of design suited to material than is to be seen in the cast iron work exhibited at Philadelphia by Messrs. Barnard, Bishop & Barnards, of the Norfolk Iron Works, Norwich, England. They have on exhibition, in an elaborate pavilion, a large variety of decorative cast iron work. The pavilion itself, as an example of art casting, is wonderful. There is probably but one firm in this country that is capable of producing castings as sharp and smooth as those from which their pavilion is constructed. The designs are worthy the highest praise, they are admirably adapted to the material, are sharply cast, and are altogether satisfactory to the eye. To produce such work it is not only necessary to have good designs, but patterns, sand, molders, iron, and the thousand other things which go to make up good castings, must be watched with the utmost care, and kept up to the very highest standard of excellence. There are art castings now in our office in which all projecting angles are sharp and clean, and the plain surfaces as smooth as need be, yet the work is ruined because the hollows of the pattern were not well cleaned. This is but one of the methods in which a casting can be spoiled, yet it is as utterly ruined as though iron, sand, molder and pattern were all bad. In other words, a good casting depends upon everything, while a poor one may result from the failure of any single thing. The public eye loves beauty and appreciates it whenever and wherever it finds it, and there is practically no limit to the extent to which ornamentation may be carried. If poor, over-loaded or barbaric it may be tolerated because better is not to be found. Decoration has become a necessity, public taste demands it, but it is no longer satisfied with, though it may for the moment accept, poor decoration. But it will only do so until good things are offered. This has been time and time exemplified in the sudden loss of market which standard, but poorly decorated goods have suffered when beautiful goods of the same character have come into competition with them. Manufacturers have overlooked this fact, and have thought that any ornament was good enough for the people. This might have been true once, but it is so no longer. People will pay for art, with little regard to the cost, provided only that it is good and they get the value of their money. Every manufacturer cannot originate, but he can imitate, and there is an abundance of good ornament; the world is full of it in fact, and it is easily accessible.

These remarks may seem discursive and lacking in practical interest to the general reader, but to the practical man and manufacturer they may contain suggestions of value. We hope in future numbers to give the discussion of this topic a more practical direction.

American Iron and Steel at the Centennial.

We confess to a feeling of disappointment and chagrin at so much of our Centennial Exhibition as is supposed to represent the iron and steel industries of the United States. It is unquestionably inferior to what it should be, and to what, with a little effort, care and expense, it might have been. We refer to it as a presentation to the world of what the iron and steel industries of the country, as a whole, have done, and in this view it is a lamentable failure. We do not wish to be misunderstood in this. There are individual exhibits that do us the highest credit, and place us on a par, in the matter of quality of our iron, with any nation in the world. But, as a whole, justice has not been done our iron and steel manufactures, and visitors will take away with them a very inadequate idea of the extent, importance, and, above all, the quality of our product. Our foreign visitors who have had the time and means, have visited our works and mines, and know of the value, character and importance of these industries—but all have not done this, and our own people, especially, will fail to comprehend the present extent and the possible future of our iron and steel interests.

For this state of affairs the management is partly to blame, but the exhibitors far more. In the first place, our iron and steel exhibits are scattered all over the Exhibition. Part are in the Main Building, part in the Mineral Annex, some in Machinery Hall, more in the Government Building, and some even in Agricultual Hall; and where they are not it would be difficult to state. We need not say that, had our entire exhibit been brought together and properly arranged, it would have been far more interesting and instructive.

Again, the classification and consequent cataloguing is wretched. The exhibits in the Main Building are an exception to this, and we may also add that the Government Building exhibit is classified as a whole; but with these exceptions the classifications are ridiculous. To prove what we say, let any one search for the exhibit of Jones & Laughlin in the catalogue of Machinery Hall, or Barnum, Richardson & Co., or the Midvale Steel Works, or a score of others.

But these are minor points. It is the exhibitors themselves who are most to blame, and the chief error is a failure to furnish full and reliable information as to the quality of their products. We do not mean mere assertions, but reliable analyses, records of tests, results of working, etc. Compare the Swedish exhibits in this respect with ours—the Fagersta exhibit, more especially. The only iron exhibit which compares remotely in the thoroughness and completeness of its publications in this respect is that entered by the Hamburg Iron Works, showing Henderson's patent iron, and, if we are not mistaken, the tests, analyses, etc., of this iron are all English.

But we will do better at our next Centennial, and trust to have an opportunity to make a more creditable showing before that time. If the proposition to have an Exposition in New York in 1883 is carried out, we shall have it then.

Our Bituminous Coal Export to Brazil and Spanish America.

It is to be hoped that lower coal prices will stimulate our export of bituminous to Brazil and Spanish America. The number of vessels leaving our Atlantic ports for Cuba during the sugar season in search of cargoes is most of the time in excess of the tonnage for which there is available freight, and many of them are thus compelled to leave in ballast. Coal at a price low enough to compete with English would induce the owners of these vessels to load them, if need be, for their own account, and they would be content with a small margin of clear profit.

In 1873 we exported altogether 1,086,253 tons of bituminous coal, but a small portion of which to tropical America, viz.:

To	Tons.
Brazil	1,735
Hayti	175
Mexico	2,999
Cuba	30,301
Danish West Indies	18,511
French "	13,757
British "	2,443
Colombia	6,363
	75,684

Most of the coal was shipped from Philadelphia, Baltimore and Richmond. Some was shipped from New Orleans. Thus far this year New York shipped to

	Tons.
Cuba	6,632
Hayti	60
Other West Indies	83
Mexico	162
South America	2,464
	9,401

to other places 9668; together, 19,069, against 24,075 during the corresponding period in 1875. To Brazil alone, Great Britain shipped last year 365,172 tons, against 386,357 in 1874, and 395,081 in 1873. The consumption of Brazil being steadily on the increase, the presumption is that more than the British decrease is now made up by importation from this country. The following are the statistics of British coal export for three years:

	1875. Tons.	1874. Tons.	1873. Tons.
Russia	884,861	883,764	612,369
Sweden and Norway	1,139,273	920,607	792,535
Denmark	760,719	662,289	593,199
Germany	2,154,367	2,057,029	1,668,680
Holland	455,201	447,621	465,316
France	2,705,494	2,370,661	2,479,421
Spain and Canaries	695,762	581,613	619,248
Italy	954,694	966,134	8?2,992
Turkey	241,918	311,991	233,840
Egypt	532,376	639,276	547,549
Brazil	365,172	386,357	395,081
Malta	228,081	313,022	261,651
British India	608,259	659,986	540,706
Other countries	2,753,859	2,726,850	2,605,079
Total	14,475,036	13,927,205	12,617,566

Additional quantities of coal shipped for the use of steamers engaged in the foreign trade amounted in the year 1875 to 3,278,249 tons, against 3,140,383 tons in the previous year.

The quantity of coal exported from Great Britain during the first six months of the current year was 7,491,077 tons, against 6,197,209 tons in the corresponding period of 1875. The value of this aggregate was £4,221,865, against £4,348,293.

In 1860 British coal export did not exceed 7,412,575 tons; in 1865 it was 9,283,214; in 1870 it reached 11,702,649. In other words, it doubled in the short space of 15 years. If this increase continues unchecked, it is estimated that by the close of the century England will export between 25,000,000 and 26,000,000 tons. Supposing that consumption there augments in a normal ratio forward, it is calculated that a total production of 150,000,000 to 160,000,000 tons will then be absorbed without difficulty.

The world's coal production is roughly valued in the following proportion:

	Tons.
Great Britain and Ireland	125,000,000
Germany	30,000,000
Belgium	20,000,000
United States	25,000,000
France	12,000,000
Other countries	10,000,000
Total	222,000,000

Our own consumption has increased as follows:

	Tons.
1830	11?,083
1840	864,379
1850	3,242,766
1860	8,513,128
1870	15,113,407
1875	20,000,000

At the same ratio of expansion it is estimated that 30 years hence we shall be using 44,000,000 tons. But this output may be indefinitely expanded, if we succeed in supplanting Great Britain in the near-by and remoter markets. This can, however, be accomplished by cheapness only, hence the problem of increasing our export to Spanish America and Brazil is one of the utmost importance in connection with our coal trade. England's coal export has been mainly increased during the past twelve months by greater cheapness. The average price of the coal exported in June, 1875, was 13/7 per ton, while in June last it was but 10/10. Although strikes in the English coal regions have been more numerous than last year, a great many new collieries have been sunk, and no material reduction in the production is anticipated. In our competition with English coal abroad, the relative cheapness will consequently be a more important item than ever.

The Lack of Red Short Irons in the West.

Rolling mill proprietors in the West are beginning to realize with considerable alarm that the stock of strictly red short pig irons is becoming very much reduced, and that few or no additions are being made to it. The ruling rates of pig iron are so low that furnaces cannot run on Lake Superior ores alone and clear themselves, and as a result more and more cinder has been added to the charges until the iron has become cold short instead of having the well known red short character of irons made from Lake Superior ores. It is an absolute fact that the only red short irons in the Pittsburgh market to-day from the furnaces in its neighborhood are either old stock that has been on the furnace banks for months, or else it is mill irons made when running on Bessemer pig, but too close for use in the converter. None of this can be bought at the ruling prices for forge irons.

The immediate result of this state of things is to put the mill manager all at sea regarding his mixtures. Irons that he has heretofore regarded as "Standard," and used with unquestioned confidence to correct his boiling furnace working when it got all wrong, he now finds need correcting themselves, and he is working in the dark. Another result of the use of cinder in such quantities will be "poisoning" the pig iron to such an extent as to make it worthless. This will not be immediate, but it is sure to come. This cinder pig will go to the rolling mills and the cinder made from it with its ever increasing per cent of impurities will be returned to the furnace, and it will only be a question of time when the percentage will be so great as to make it impossible to use it. This has happened again and again. We know of a rail mill with blast furnaces attached, that kept up this treadmill use of cinder so closely that the pig iron made Monday was used Tuesday, and the cinder from it put back into the furnace Wednesday, and so it went on. At last the pig iron got too bad even for rails. We have before us two analyses of cinder sent to a blast furnace, containing 3·58 per cent. and 3·56 per cent. of phosphoric acid. While we have no doubt but that a small percentage of cinder can be used with good results with Lake Superior ore, the amount that is being used, if long continued, will ruin not only the reputation but the character of the best iron.

We regret that, through inadvertence, the name of the author of the valuable treatise on the Theory of the Steam Hammer, lately printed in these columns, was incorrectly printed. Instead of Edwin L. Wallis, it should have been printed Edwin L. Wiles, M. E. Mr. Wiles is an accomplished gentleman, a graduate of the Stevens Institute of Technology, and a very thorough student of the principles of mechanical engineering. His paper on the steam hammer is a valuable contribution to current technical literature, and as it by no means exhausts the subject, we hope he will follow it with others of a more popular character on the construction and use of steam hammers.

New Publications.

THE COMPLETE PRACTICAL MACHINIST: Embracing lathe work, vise work, drills and drilling, taps and dies, hardening and tempering, the making and use of tools, etc. By Joshua Rose; illustrated with 130 engravings. Published by Henry Carey Baird & Co., No. 810 Walnut street, Philadelphia. Price, $2·50.

Mr. Rose has undertaken a useful work, in the success of which all friends of industrial progress should feel an interest. He has assumed the task of creating a cheap, popular literature of the mechanical arts connected with steam engineering, and we are glad to say, on the strength of a personal acquaintance with the gentleman, that we consider him well qualified by taste and education for the proper performance of this most important duty. Mr. Rose is a thoroughly practical mechanic, with a large experience and a great deal of natural common sense. Too many of the writers of elementary treatises on mechanics are not practical, and cannot—or do not—bring theory to the strict test of practical application in every case. Mr. Rose assumes, and correctly, that the average machinist is not well trained in mathematics, and that he has had neither the time nor the opportunity to acquire the broad and liberal culture which is necessary to the complete understanding of the higher literature of mechanics. If the student finds that the information he seeks is given only in formulæ which he cannot understand, he is discouraged at the outset, and naturally concludes that the acquisition of a fair degree of mere manual dexterity is the measure of his ability. If, on the other hand, he finds the knowledge he needs easy of acquisition because simply and clearly presented, he is encouraged to pursue his studies until he is able to elucidate what were before impenetrable mysteries. With this in mind, Mr. Rose has endeavored to write a simple, clear treatise on machine building, which any person of average intelligence and familiar with the language of the shop can read understandingly, especially with the assistance of the numerous and very good illustrations. Such a book cannot fail to be valuable, and we are glad to announce its publication.

The scope of the book includes all branches of the work of the machinist. Its chapter heads are: Lathe and Machine Tools; Cutting Speed and Feed; Boring Tools for Lathe Work; Screw Cutting Tools; General Observations on Lathe Work; Turning Eccentrics; Hand Turning; Drilling in the Lathe; Boring Bars; Laps; Twist Drills; Tool Steel; Taps and Dies; Vise Work; Fitting Connecting Rods; Milling Machines and Tools; Calculations of the Speed of Wheels, Pulleys, &c., The Slide Valve, and Pumps. The work is well and carefully indexed.

Counterfeit Gold Coin.—The *British Trade Journal* says: Our bronze coinage is largely minted in Birmingham; but not content with that, the Brums have, it would seem, taken to make sovereigns on their own account, using, for economy's sake, an alloy known as platinum gold, which must resemble the genuine metal very closely, for these new counterfeits correspond so exactly in weight, color, ring and cutting to good sovereigns that they have deceived many experienced bankers, being, beside, admirably executed. The base metal is, however, a trifle lighter than gold, so that the coin made from it is slightly larger, while the ring is a little sharper than that of gold, and the color a shade lighter than that of the English sovereign, resembling more in that respect the Australian coinage. It is to be hoped that the forgers may soon be discovered, for the differences between these counterfeits and the genuine sovereign are apparently much too slight to be readily appreciated by the general public.

Hardware at the Centennial.

THE AUSABLE HORSE NAIL COMPANY.

The exhibit of the Ausable Horse Nail Company, in Agricultural Hall, is interesting even to the casual visitor on account of the taste and skill displayed in the arrangement of the goods. On a carpeted platform inclosed by an ornamental railing is a column of boxes of nails, surmounted by a handsome canopy of black walnut, upon which is placed a golden eagle. At the base of this unique and picturesque structure is an elegant plate glass case, containing samples of the various sizes and styles of nails manufactured by the company, which are described upon ornamental cards for general distribution, printed in English, French, German and Spanish. This is an assistance to foreign visitors not familiar with English, which cannot fail to be appreciated. The goods shown include all sizes and varieties of horse nails, finished and unfinished, polished and blued, pointed and plain. The samples were not made for exhibition, but fairly represent the average product of the works, which gives them additional interest as specimens of American machine products. The Ausable Horse Nail Company claim for their nails many important advantages, among which are included soundness, strength, symmetry of proportion, and unvarying uniformity of size, shape and breadth of head. The requirements of a good horse nail are various and imperative, and it is only within a few years, comparatively, that the practicability of imparting these requisite qualities to a machine-made horse nail has been generally conceded. The best temper for a horse nail is that which combines sufficient stiffness to penetrate the hoof with sufficient ductility to clinch down after it is driven, so as to draw and hold the shoe firmly in its place. It is claimed that this peculiar temper cannot be given by forming the nail completely either cold or hot. It must be wrought hot nearly to completion, and then, by a second operation, hammered or otherwise condensed cold until the requisite stiffness is imparted and no more. The machinery and processes employed by the Ausable Horse Nail Company enable it to so combine these two operations as to produce this required temper exactly. The principle has been known and acted upon for generations in making nails by hand, and in making them by machinery the operations of the new process have been successfully imitated. The result is a nail possessing all the qualities requisite for holding the shoe firmly and permanently on the hoof. Nails which do not possess the right temper are apt to be stiff and elastic—reacting under the hammer in the operation of clinching, refusing to hug the hoof, and, consequently, holding the shoe loosely and only temporarily in place. As above stated, the manufacture of horse nails by machinery is peculiarly an American industry, which work in a comparatively few years has attained extensive proportions. The history of the Ausable Company shows how greatly it has developed and how extensive it has become. The works of the company were established at Keeseville, Essex county, N. Y., in 1863. Their capacity was equal to a production of 200 tons of nails per annum. Since that time they have steadily increased their capacity to 2500 tons. The works include four nail mills, a rolling mill for rolling nail rods, a saw mill for sawing lumber for boxes, and an extensive box factory. The nail machines are the invention of Mr. Daniel Dodge, and are certainly very perfect in operation. The works employ between 300 and 400 hands. The warerooms and offices of the company, under the management of Mr. Abraham Bussing, Secretary, are at No. 35 Chambers street, New York.

H. D. SMITH & CO.,

Plantsville, Conn. The exhibit of carriage hardware made by H. D. Smith & Co., Plantsville, Connecticut (No. 3401), is one of the most elegant and extensive in the Exhibition. It occupies the post of honor in the center of the Carriage Annex, and consists of carriage makers' forged ironwork contained in their silver framed French plate glass cases, *i. e.*, two octagon cases 3 feet in diameter at base and 6 feet high, and one long case with beveled sides and ends, 12 feet long, 3 feet wide and 13 inches high. The octagon cases at either end of the long case are placed upon octagonal pedestals, and the long case upon a heavy table. Both table and pedestals are of black walnut with raised and polished French walnut panels, and all these stand upon a velvet carpeted platform raised about 3 inches above the floor level. The inclosure is surrounded with a silver-plated railing supported upon black walnut posts. The area inclosed is 20 feet by 3 feet 6 inches. One of the octagon cases is filled with samples of each of the large variety of sizes and patterns of axle clips made by this house. The other is filled with samples of forgings which have not received any extra finish. The long case contains an extensive variety of extra finished forged irons for carriage makers' work. A brief description of its principal features will interest our readers. Every article shown is forged solid from the finest Norway or Lowmoor iron by patented processes, and extra finished by milling and fine filing, requiring more skill than to produce a polished or plated surface. A feature of the exhibit is the variety of shaft couplings. They are so accurately sized that couplings of a given number are interchangeable, and are sent to market separately packed. The blacksmith who buys two parts of a coupling of given size may be certain that they will fit accurately. Smiths' patent noiseless coupling has a rubber packing, having its internal surface lined with a tempered steel cylinder so constructed that both move with the shaft eye, securing the elasticity of the rubber, and preventing friction from the shaft eye or the bolt. The bolt is slightly larger than the hole expands the cylinder, which compresses the rubber, forcing it out against the ears, and making a water tight fit in the eye and on the bolt. It is claimed that such a coupling can be used constantly for years without rattling. In the Central Park and Flanged Eye couplings the flanges are made solid on the sides of the shaft eye, when bent down to the wood, preventing the shaft end from splitting and making a better finish and more solid fastening for the shaft head than can be secured with the T head bolt. Bridging over the corners of the ears to the shackle part not only gives great strength where the greatest strain comes, but by holding the shaft rubber down on the shaft eye, causes it to form a smooth finish with the iron, and prevents the rubber from splitting or spreading out of shape. Examining the axle clips shown in this exhibit we notice that the shank is so set on the flat part that no portion of the shank or round part projects in toward the axle beyond the turn of the inside of the flat part of the clip, which allows it to fit snugly against the axle, and insures a square, solid bearing of the whole clip. The shank is of a full, uniform round, full up to the flat part, so that it will fit and fill the holes in the clip yoke. The flat part is thickest where most strength is needed, *i.e.*, at the ends. The pattern spring bar clips are made of full width in the center where the clip bears on the wood, and taper toward the ends. They are light, strong and unusually well finished. Among saddle clips we notice the octagon and skeleton patterns, which have edges to top plate milled to a true bevel and corners to clip worked out to sharp, well defined angles. The Brewster & Co. patent for double perch, and the double saddle clips for single perch, are forged solid; all are excellent in style and workmanship. Among step pads we notice the patent open cross-bar step, in which the bars run crosswise of the step, and which is supported by a ring underneath, in place of one point running to the middle of the step plate. The face of the step is so lined that there is no danger of the foot slipping from it. In proportion to its weight, this step is very strong. The embossed step, also exhibited, is forged in dies which raise sharp, angular figures upon the face of the plate. Several styles of slat irons are shown. Smith's patent slat irons have flanges raised on the sides near the bottom, from the point where the wood bow comes upon the slat to a little beyond the lower screw hole, forming a depression which receives the end of the bow and prevents it from splitting. The flanges also strengthen the iron around the lower screw hole, where they often break. The slats all turn on one center—the seat iron—and no rivets are used. The New York and Philadelphia extension patterns are made thicker at the lower screw hole; the holes are drilled, and the heads milled. The milled Lowmoor joints made under Smith's patent are drawn from bars double the size of the finished joints, and without upsetting the iron to form the head. This makes a stronger joint than is usually secured when the head is made by upsetting the iron. The middle, or male, part of the joint, is made thicker than the ears to the other part. The whiffletree plates made under Brewster & Co.'s patent are formed by forging and milling the top and bottom plates to an exact fit. The hook on the back prevents the whiffletree from pitching forward toward the horse, and holds it in place even if the bolt becomes loosened. The top props made under Thomas & Smith's patent are so well known that a detailed description is unnecessary. By means of a thread the collar is made to screw snugly down to the leather, holding it firmly, keeping water from under the collar, and preventing the leather from shrinking away from the prop. The prop iron is forged from one solid piece of metal. The fifth wheels shown in this exhibit are made thicker near the clips where the most wear comes. The back rods are not welded at the corners where the round rods join the half rounds, but are made solid at these points, and, it is claimed, never break. There are no meeting surfaces at the back, where fifth wheels usually rattle. Among the many articles not mentioned above, but which form important features of the exhibit, are gridiron and French coach steps, coach axles, short springs, axle saddle clips, clip king bolts, perch and bed plates, spring braces, smooth finish clip yokes, king bolt yokes and braces, whiffletree bolts, felloe holders and joint bolts, felloe plates, prop nuts, loop heads, offsets, stay ends, fifth wheel anti-rattlers, &c., all of which are well made and excellent in design and workmanship. In detail, and as a whole, the showing is highly creditable to the exhibitors and the country. The firm of H. D. Smith & Co., which consists of Messrs. H. D. and George T. Smith and Edward W. Twitchel, was established in 1850. With the exception of two or three articles, the productions of this house were the first machine-made carriage irons manufactured in this country. Their business began with the manufacture of shaft couplings, and was gradually extended to include all kinds of carriage hardware. All these extensive and varied products are made by machinery, of better quality, greater uniformity, and less cost than if made by hand. They make the largest variety of forged carriage irons manufactured by any one house in the country, and the greatest quantity. Judging from the character of their exhibit, we should say that their quality was up to the highest standard of excellence now attainable.

The Hudson River Suspension Bridge.

The projectors of the Poughkeepsie Suspension Bridge announce that they have now secured all the money they want, and that work will begin at once. The contract for building the bridge has been awarded to the American Bridge Company, of Chicago, and leading officers of that company have arrived in Poughkeepsie to commence the preliminary work. One contract has already been made by them for lumber and timber for the first caisson, and they have leased the Collingwood docks at the lower landing, on which they will erect shops and buildings for their machinery and for the reception of stone and lumber. The point fixed upon for the structure to cross is near the upper landing or ferry dock, and at the intersection of the Poughkeepsie, Hartford and Boston Railroad and the Hudson River Railroad. The bluffs rise to the hight of 110 feet on the east shore, and 130 on the west shore. The elevation of the bridge above high water mark will be 130 feet, which will place it above the tallest masts of river vessels. The distance across the river at this point is 2420 feet, or 220 feet less than half a mile, and with the land approaches the entire length of the bridge will be 3400 feet. It is to be a pier bridge, and five piers are to be sunk in the river, each 500 feet apart. The following is the estimate of the cost of building the structure and the business:

COST OF BRIDGE.

For foundations, masonry and iron superstructure complete, including approaches	$4,000,000·00
For right of way and incidentals	500,000·00
Total cost	$4,500,000·00

RECEIPTS.

Estimated Daily Business—Easterly.

Three hundred cars of coal, each 10 tons at $2 each	$600·00
Two hundred and thirty cars of grain, flour and general merchandise, at $3 each	690·00
Westerly.	
One hundred cars of ore and general merchandise at $3 each	300·00
From passengers, mail and express	352·05
Daily receipts	$1,942·05
For 312 days—gross earnings	609,919·60

DISBURSEMENTS.

Deduct 4 per cent. for operating expenses	$24,236·78
Deduct 10 per cent. gross earnings for sinking fund	60,591·96
Deduct 7 per cent. interest on $3,500,000 first mortgage bonds	245,000·00
Total	$328,828·74
Net earnings	276,090·86

The work of building machinery to aid in carrying on the work of constructing this bridge has been in progress for many days, and a considerable portion of the machinery is expected to arrive at Collingwood's dock the fore part of next week. The American Bridge Company have also sent out proposals for the stone for the first caisson. It is estimated that each of the four piers in the river, completed to the water surface, will cost $150,000. A vessel is now moored in the river with the necessary machinery on board for completing the soundings.

The following table shows the advantages this route will have in the matter of distances:

	Miles.
From Scranton, Pa., or the coal mines of that region to Springfield, Mass., by way of Albany, over the only present all-rail route	305
To Hartford, Conn.	331
To Boston, Mass.	403
To Providence, R. I.	420
From Scranton to Springfield, Mass., by the Poughkeepsie Bridge	212
To Hartford, Conn.	204
To Boston, Mass.	310
To Providence, R. I.	295

Saving in favor of the Poughkeepsie Bridge route:

To Springfield	93
To Hartford, Conn.	127
To Boston, Mass.	93
To Providence, R. I.	121

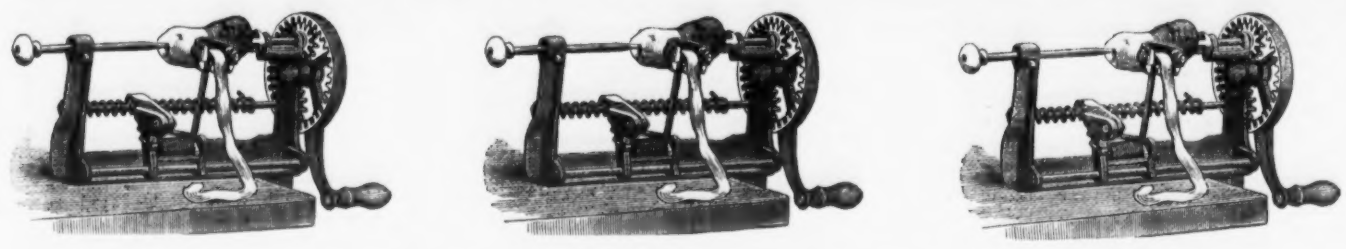
The proximate distance from Scranton to Springfield and Hartford being 318 by Albany and 212½ by Poughkeepsie, there is a saving of 105½ miles in 318, or 30 per cent.

Wave Power.—Additional experiments made in England with Mr. Tower's machine for obtaining motive-power from the motion of a ship among waves have attracted renewed interest in the invention, and also in the general scientific question which it undertakes to solve. The machine has at least the merit of simplicity, consisting in principle of a weight supported on a spring, so that it can oscillate on the spring easily through a considerable range in a vertical line. The scale of the spring, and, consequently, the natural period of oscillation of the weight can be varied at will. When it is so adjusted that it synchronizes with the waves, the oscillations become very violent, and a large amount of power can be obtained from them. In practice the springs consist of highly compressed air, pressing on the rims of hydro-pneumatic cylinders, and the arrangement is such that the vessel containing the compressed air forms the moving weight. The inventor has designed a machine for working an auxiliary propeller of a sailing ship of 1800 tons displacement. The moving weight in this case is 200 tons, and it is shown by calculation that it would give about 30 horse-power in the long swell met with in the tropical calms, 260 horse-power in average ocean waves, and more than 600 horse-power in a heavy head sea. The space occupied by the machine is represented as comparing favorably with a steam engine of the same power.

An exchange newspaper says that "Japan's new postal system is a success, and in nearly every town may be seen the sign in English, 'Post Office.'" Every post office is furnished with a scale of American manufacture, made by the well known house of Fairbanks.—*New York Evening Post*, Aug. 25.

A firm in Newark have just cast a stove for the United States steamship Fulton, which weighs 15,000 lbs., and is intended to cook for 850 men.

GOODELL COMPANY'S MANUFACTURES



Lightning Apple Parers,
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POTATO PARERS

Bay State Apple Paring and Slicing Machines.

EVERYBODY is satisfied that the new **POTATO PARERS** which we have recently made and placed on the market are **the great success** of the year in small machines for **saving labor,** and **EVERYBODY wants them.** They are sure to sell, as they are a long-wished-for article.

Send for our new Circular, Prices, etc., and don't forget to send in your **orders.** **Our Fruit Preparing Machines** are the very best that are manufactured.

BUTCHER KNIVES & TABLE CUTLERY.

Also manufactured by us, under Wood's patents, are proving by trial to be the best and cheapest now known.

The cutting qualities of the Butcher Knives made by us are unexcelled, their Patent Handles are better than any others, and price asked for them is so low that the trade will buy no others if they once try them. Our facilities for making the best Apple, Kitchen and Shoe Knives at the lowest possible price are unequaled. We solicit liberal orders from the trade.

GOODELL COMPANY,

Sole Manufacturers of the Above Goods, - - - - ANTRIM, N. H.

The Origin and Progress of Industrial Exhibitions.

BY HUGH W. SWENY.

(Concluded.)

Overshadowed by the loss the nation sustained on the sad 14th of December, 1861, the great international exhibition, at London, in 1862, had to struggle against the absence of court ceremonials, and to rely for success solely on intrinsic merits. The building of brick, unornate, not to say plain, was externally distinguished by two domes, one on the axis of each transept. These domes, composed of iron and glass, rose to a hight of 200 feet, were crowned by ornamental finials 55 feet high, and had each a diameter of 160 feet. The main building was a parallelogram, about 1150 feet long by 560 wide, and the total area roofed in was 988,000 square feet, the total space covered and uncovered amounting to no less than 1,231,000, and the total cost some £460,000. The domes and the picture galleries were the great successes of the designer, Captain Fowke, and the erection of the former by Messrs. Kelk & Lucas was a triumph of engineering skill.

In the industrial and machinery sections the progress was marked in every branch, but it was in the department of fine arts that the 1862 exhibition stood pre-eminent. Here not only was Continental art fully displayed, but here may the glories of English art be said to have culminated, that unrivaled collection being almost exhaustive, giving us works well known from engravings, but many of which as paintings had up to that time been sealed books, kept under the guardianship of lock and key in royal and ducal galleries, and here for the first time thrown open to the world's gaze. Here were Hogarth, Gainsborough, Reynolds, Wilkie, and a goodly company of those great masters of British art who had passed away, with those giants of the palette, Maclise, Mulready, Clarkson Stanfield, Sir Edwin Landseer and David Roberts, who have since been taken from us. 30,000 people assisted at the opening by the Duke of Cambridge; 2000 choristers and 400 musicians gave effect to the setting by Sir Sterndale Bennett of the Poet Laureate's ode, and the effect, both of sight and sound, was one of unsurpassed magnificence. Other exhibitions had been noted for the absence of those slaves to the "leaden messengers, that ride upon the violent speed of fire," but here, in Tennyson's words—

> Were trophies brought from every main,
> And mixt as life is mixt with pain,
> The arts of peace with those of war,

and it would seem impossible to say whether the doors of the Temple of Janus would open wide or remain for ever closed. The exhibition opened on the 1st of May, a notable feature on that day being the presence of the Japanese ambassadors, and closed on the 15th November, being a total of 171 days. The amount received was £408,530. 1/8, and the number of visitors 6,211,103, the maximum being attained on Thursday, October 30th, with 67,891. 1863 can count but two exhibitions, one for the Duchy of Nassau at Wiesbaden, the number of exhibitors being no less than 1317, and Constantinople with its exposition, comprising the natural and industrial resources of the empire.

In 1864 the "Merseburg" Industrial Exposition was held, taking in Saxony, Hanover, Weimar and Eisenach, Gotha, Anhalt, Meiningen, Schwarzburg, Sonderhausen and Rudolphstadt, and thus constituting itself a German exhibition.

1865 saw many varied gatherings, all international, that of Amsterdam being devoted to flowers, at which, strange to say, neither black tulip, blue dahlia, nor green rose, put in a claim for the grand medal of honor, Paris, calling a cheese conference, at which Stilton, Cheddar, Glo'ster, Gruyere, Brie, Roquefort, Bondon, evil-smelling Limberger, Liptauer, Schapziger, Parmesan, Gorgonzola, Ementhaler and Gouda stood forth as the representatives of casein; whilst the displays of Dublin, Oporto (3911 exhibitors), and Stettin (1451 exhibitors) appealed to the general mass of industries.

The Dublin Exhibition of 1865, like that of '53, owed much to the liberality of a citizen, the munificent donor on this occasion being the late Sir Benjamin Lee Guinness. The building, a gossamer-like structure of iron and glass, was opened on the 9th of May by the Prince of Wales in the presence of some 10,000 spectators, and was closed on that day six months, having been open 159 days and 51 evenings, the total number of admissions exceeding 900,000, being an average of 5000 by day and 3000 by night.

The Dublin Exhibition of '65 did not belie the reputation it had gained in '53, and many of the works of art then exhibited, both paintings and statues, were retained to adorn this country. The sculpture gallery will, like the Roman court in 1862, long remain a pleasant memory for those fortunate enough to have seen them. Philadelphia, it may be also noted in 1865, convened manufacturers from all parts of the United States. The Scandinavian Exhibition of 1866 has been already spoken of, and it may be here mentioned that the Empire of the Brazils had in this year an exhibition of raw products at Rio Janeiro, comprehending 2374 exhibitors.

Between the Avenue de la Bourdonnaye and the Avenue Suffren, on an historic site, stood in 1867 the edifice denominated by the Emperor Napoleon as a "magnificent gasometer." To Prince Napoleon is due the conception of the idea, and the words of the Imperial Commission fully describe it "An area with two main entrances, manufactures, and products of cognate natures, to be arranged in concentric bands, with a garden in the middle. The different nationalities to intersect the bands by transepts or avenues radiating from the center." Admirable in theory, you passed down one of the spokes of this monster wheel, and you saw all that the country had to show; you went round an ellipse, and the relative qualities of similar productions in various lands were all presented. But as all "nations need what other lands produce," so the displays were irregular, and the theory fell to the ground. The external ring of the building was devoted to machinery, the internal to the "History of Labor," beginning with Gaul before the use of metals, and ranging through the first and second epochs of caves, the age of stone, the age of transition and of lacustrine dwellings, free Gaul, and Gaul under the Romans, the days of Charlemagne and of the Carlovingian kings, the Moyen-Age, the Renaissance, and all the changing fashions at home and abroad down to the commencement of the last century—a magnificent idea in truth, and superbly carried out. Indeed, in every sense was the exhibition of '67 a marvelous spectacle, with its park studded with mosques, Russian "alobodas," Swiss chalets, Tunisian kiosks, Swedish cottages, English lighthouses, Egyptian palaces (with a museum of Egyptiology arranged by Mariette Bey), stables for dromedaries, a temple and an "okel" or caravanseral, all massed in picturesque confusion.

One feature of the exhibition was the engineering triumph of the age and of M. Ferdinand de Lesseps, the model of the Suez Canal, with its navy of dredges, steamers and boats. All this shown to the wondering eyes of kings kaisers, and *canaille* sustained the historic reputation of the scene. For here on this Champs de Mars did noble, abbe, proletarian, great lady and grisette work at the mounds that were to circumscribe the theatre of the Fete de la Federation; here did Louis XVI. on a new altar swear to a newer constitution; here, in the words of Lamartine, had the "red flag, streaming with a nation's blood, made its sanguinary circle;" here had the first exhibition of manufactures been held in 1798; and here, during the Hundred Days, had the first Napoleon, on this same Champs de Mars, (re-christened Champs de Mai), at another altar taken oaths to another code. Few spots have condensed more history in a brief space of time, nor was the present event unworthy of the past memories. To speak now of the practical, the exhibition opened on the 1st of April and closed on the 3d of November—a total of 117 days, Sundays included. The total number of visitors was 6,805,969; that of exhibitors, 42,217; and the amount received, £420,735. 7/2, the greatest number of visitors on any one day being 173,923, on October 27th. Leeds, in 1868, linked art with charity in an exhibition rivaling the Manchester gathering of '57, her display of last year stopping short at the prosaic and practical. In '69, Amsterdam, and in '68, Roumania, at Bucharest, had their exhibitions, whilst Altona and Cassel, in '70, repeated the oft-told tale; Russia, in the same year, renewing her expositions of the empire at St. Petersburgh. At Moscow, in 1872, the Polytechnic Exhibition, held in the historic Kremlin, marked an era in Russian industrial history; the Dublin Exhibition of the same year, of arts, industries and manufactures, with its museum and national portrait gallery, attracting 430,000 visitors during the 154 days and 58 evenings it remained open.

The Weltausstellung in the Prater of Vienna made memorable a year otherwise unnoteworthy, but the splendid pageant of '73 is so much a thing of to-day, that there seems little reason to again describe the main building with its rotunda (within which all the domes of the world could be inclosed), surmounted by the monster model of the imperial crown, its jewels winking in the sunlight, "polished perturbation, golden care," its hall with marvels of machinery, its palace of Fine Arts, its Museum of Amateurs, its agricultural halls, and the 400 buildings set in its splendid park, the Persian palace with its mirror mosaics glistening in the sun, Turkish, Egyptian, Japanese, Roumanian, Styrian, Swiss, Russian, Kirgish, Samwede, Sclav, Mourish, German, Bohemian, Hungarian, Italian, Polish, French and English dwellings all scattered amidst woodland scenery; and as Paris, in 1867, placed on view the triumph of her engineer, so Italy put in evidence the latest result of human skill in a monster model of the mouth of the Mont Cenis Tunnel—railway, signals and train complete. People then the scene with all the nationalities of the world, recount all the personages in the Almanac de Gotha, guests of Franz Josef and the beautiful Empress, and one can somewhat realize the events, facts, fetes and faces of 1873; 186 days was it open, Sundays included; its visitors were 6,740,500, and its receipts £206,477. 13/.

So from the five great International Exhibitions (London, 1851, 1862; Paris, 1855, 1867; Vienna, 1873) we get a total of 32,959,097 visitors, and a cash aggregate of £1,588,164. 10/10.

The annual international exhibitions at South Kensington in 1871, 1872, 1873 and 1874 did not realize the expectations of their promoters, for, though the first year yielded a large profit, the public interest rapidly died out, till the scheme was abandoned before half the proposed term had expired.

It is only necessary, in conclusion, to say that the tally of exhibitions is completed up to the present time with the mention of the International Exhibition of Maritime and River Industries at Paris, and the International Exhibition of Chili held at Santiago, both in the past year. Two omissions, however, have been made, one being the international cattle shows held in connection with the exhibitions of '62, '67 and '73, respectively, at Battersea, Billancourt and the Prater; the other, a still more important one, the first exhibition of the Japanese empire, held at Kioto, of the objects destined for the Vienna show. This opened on the 17th of April, 1872, was so successful that the original limit of 50 days was extended, and the exhibition did not close until the end of July. The next year the Mikado decreed an exposition on a much wider basis, presenting a comparison between the past and present, and even affording a glimpse into the future of Japan. Exhibition buildings were found ready to hand in the Buddhist temples of Chionin, Kenninji and Nishi Honguanji, the latter being two miles distant from the two former; and as Old Nipton was represented in ancient armor, and dresses, bronzes, gold and silver work of Kioto and Osaka, rare vessels of "Sahari," formed of an amalgam of silver, pewter and copper, relics such as the "Yeboshi" or cap, worn by the Great Taiko Sama, silver coins aged 1000 years, old porcelain from the factories of Banshu, Owari, Bizen and Karadzu (the latter most estemed of all), so New Japan contributed her lacquers, papers and silks, the porcelain of the day comprizing the wares of Seto, Kiopo, Awata, Kaga, Sampei, Saga, Nagasaki and Satsuma.

This year (to say nothing of the Finnish gathering at Helsingfors), will witness two expositions of more than usual importance, America's grand gathering in the pleasant park of Fairmount by the Schuylkill River, and the exhibition at Brussels to lessen human suffering, save human life, and put into practice the teachings of the Founder of all our creeds. Thus will the Centennium be worthily celebrated by "peace and good will to all men;" it is for England and America to set an example to the nations, for this hundredth birthday of Young America is not only merely a holiday on one side of the Atlantic, it appeals to all who speak the mother tongue; it is a bell that rings for "the unity of the English speaking world;" it tells us how we muster in our strength 76,000,000 of freemen speaking the tongue of Shakespeare, of Byron, of Washington Irving and of Longfellow, and as the cable joins the lands, so it should join the hands, and with them the hearts; once unite those who speak the old language, whether from the Old Country, from the States, from the Dominion, or from Australasia, and the peace of the world is secured; once agree that "blood is thicker than water," and nothing can ever again separate England and America save the Atlantic.

Crystalline Surface for Wood, Paper, etc.—The *Practical Magazine* says that the following is the simplest method of giving paper and wood surfaces a crystalline coating: Mix a very concentrated cold solution of salt with dextrine, and lay the thinnest possible coating of the fluid on the surface to be covered by means of a broad, soft brush. After drying, the surface has a beautiful, bright mother-of-pearl coating, which, in consequence of the dextrine, adheres firmly to paper and wood. The coating may be made adhesive to glass by doing it over with an alcoholic shellac solution. The following salts are mentioned as adapted to produce the most beautiful crystalline coating, viz.: sulphate of magnesia, acetate of soda and sulphate of tin. Paper must first be sized, otherwise it will absorb the liquid and prevent the formation of crystals. Colored glass thus prepared gives a good effect by transmitted light.

Mechanical Puddling.*

BY MR. T. RUSSELL CRAMPTON, OF LONDON.

(Concluded).

In the author's furnace, where the firing is done mechanically, little skill and no exhaustive labor are required. The fuel, in a state of powder, is automatically mixed in proper proportions with air and injected into the furnace, where it is consumed immediately in contact with the work under treatment, no coal falling into the iron. This cannot fail to be an economical mode of proceeding; the heat is not only more intense than when produced and conveyed from a separate chamber, but the fuel used in heating the ordinary fire place is entirely saved. The fuel consumed in heating iron does not depend so much on the weight of the iron under treatment as on the cubic capacity of the chambers heated, the loss of heat by radiation being very considerable in all those parts of furnaces where the gases are generated outside the working chamber. In my furnace the whole of the usual brickwork is dispensed with; consequently there is no loss in this respect. The value of perfect regularity of the flame will be appreciated, as in practical working little if any loss by oxidation is sustained in the weight of the ball as compared with the pig charged. If a ball, after being ready to be discharged is allowed to remain for two hours in the furnace without reducing the heat it is rarely the wrought iron produced is of less weight than the pig iron charged.

The furnace has produced from 95 to 104 of finished 2¾ square bars from 100 of inferior pig, the bars being reheated, rehammered, wash heated and rolled off. In the case where the fettling was weighed, 98 per cent. of bars, treated as above, were produced from 100 of pig iron, using 8 cwt. of fettling to the ton. Although these results were obtained in the ordinary working of the furnace they must not be taken as an average result. It is to this peculiar power of regulating the dust fuel and air that such good results are mainly due.

Assuming that efficient machinery has been devised capable of effecting the object, the weight of the masses operated upon is of little importance, and charges of 10, 15 or 20 cwt. or more can easily be puddled in one piece, limited only by the means for subsequent manipulation of the ball. It must be evident that in the ordinary course of manufacture by the piling system, as each layer contains a portion of dirt or cinder, it becomes wrapped up in the welded mass; this in practical working cannot be avoided, and is entirely obviated when large puddle balls are properly treated. Many think piling the better process, for the reason that the skill of the puddler can be brought to bear on small portions of the mass, and on the principle that a combination of a number of good parts must necessarily make a good whole; but it is the author's object to show that the material obtained from large homogeneous masses is superior in every respect.

Again, the quality is further improved from the more effective puddling of the revolving barrel, and the consequent better abstraction of phosphorus and other impurities, so much so that iron equal to the best Yorkshire brands has been made from common Cleveland pig. This system, therefore, admits of large articles, such as rails, plates, &c., being manufactured in one solid piece, without incurring the same risk of flaws arising from the faulty welding of the piles. If the mechanical arrangements of the furnace involve great wear and tear, and constant supervision and anxiety on the part of the mangers, foremen and men immediately connected with it, mechanical puddling will have to be abandoned, at least for general purposes, however good the iron produced may be.

On reference to the above description, three notable points of difference between the author's and the other forms of revolving furnaces will be observed: (1) There is no separate fire-place or gas generator built of brick, and no fire bars, these being entirely abolished; there is but one single revolving chamber lined with oxide of iron, forming the gas producing, gas consuming and utilizing chamber; (2) the means adopted for the supply of fuel is entirely mechanical; (3) the whole furnace is encased in water.

With respect to the mode of producing the heat, the author considers that fuel in a state of powder or minute subdivision affords the best opportunity for its economical consumption, for in that condition a machine can be constructed to feed it regularly into a constant stream of air from a fan or other blower, complete combustion being effected without excess of air, the only necessary condition being that the engine producing the blast and driving the feeder should be kept at a uniform speed. With the author's machine (which has been in use throughout the whole series of the author's experiments, extending over six years) this can be easily accomplished, the power of varying the quantities of air and fuel being entirely under the control of the workman. The author believes that neither the ordinary fire-gate nor gas furnace can practically produce combustion so efficiently as dust coal, as the degree of temperature or character of flame is under immediate control, the system allowing that the flame may be lengthened or shortened to suit the various capacities of furnaces, and maintain an equilibrium of temperature and pressure in all parts of the furnace, a result not yet attained by any other system.

After providing for the regular supply of air and fuel, the next point was to consider how a revolving furnace whilst white hot in the interior, and containing molten metal, could be constructed so as to prevent the contents leaking through a moving joint 3 or 4 feet diameter, a portion of which would be often 2 feet below the surface of the liquid metal. To accomplish this the bad effects of expansion and contraction had practically to be neutralized. The whole apparatus was, therefore, covered with an annular space, through which cold water is forced to circulate by means of a revolving cock, which it is hardly necessary to describe. The means adopted has proved so effectual, that after 2½ years' working the wrought iron casing of the furnace is in as good condition as when first erected, and still runs as true as a lathe, the joint rings remaining so perfect that the liquid metal is completely restrained from leaking between them.

With the mouth or lip of the furnace, so difficult in other systems to keep repaired with fettling, and on which so much depends, no difficulty is experienced, it being self fettling in its operation, and the workman has no need specially to fettle this part. If a portion of the fettling be accidentally knocked off, and the plates exposed to the interior heat in the furnace, the circulating water acts as a protection, and causes the melted cinder to chill and accumulate to its normal thickness. On many occasions, in the presence of friends, the last being the visit to the furnace at Woolwich by the members of the Institute of Staffordshire Iron Works' Managers, the author purposely detached large portions of fettling, thus exposing the surface of the interior iron casing to the direct action of the heat; and in a very few revolutions the liquid cinder solidified on the bare places, thus refettling the furnace automatically.

By these arrangements hard manual labor is entirely dispensed with, repairs are reduced to a minimum, fuel is saved, no smoke is produced, no coal can enter the iron, and but little intelligence is required; and as the furnace is covered with water, the men are not subjected to any oppressive heat; in fact, in summer the coolest place in the works is near the furnace. Some attention must, of course, be paid to the process, more particularly in preventing the formation of young iron, and the balling up too hurriedly. From the extreme simplicity of the operation, this may easily happen. Young iron has occasionally been produced, and not discovered until worked up. This is mentioned, as it must not be supposed that puddling, however perfect mechanically, can be made quite self-acting.

When the greatest economy of fuel is desired, it is advisable to utilize the waste heat in its passage up the chimney, either for generating steam or heating the air on its way to the furnace, or both. In a series of experiments lately made by the author in his furnace, the effect of hot air on the consumption of fuel was shown in a very marked manner. The temperature of the injected air varied in the various trials from 200° to 500°; at 380° not only was the fuel reduced two-fifths, but the furnace was hotter; beside which, he was able to use, without inconvenience, very inferior coal containing 20 per cent. of ash. A furnace with a cubic capacity sufficient to puddle 15 cwt. balls was kept a welding heat with a consumption of 3 cwt. of coal, as compared with 5 cwt. when the air was injected at the temperature of 60°. The author has not yet used hot air when puddling iron put into the furnace in liquid state; but as the time during which coal is being blown into the furnace is known in other cases to be about 40 minutes for each charge, he does not think himself over sanguine in believing that with 10 to 15 cwt. charges he will be able to reduce the coal as low as 4 cwt. per ton of puddled blooms; with 15 to 20 cwt., as low as 3 cwt. per ton. This is not so surprising as at first sight it may appear, since the gas is generated and consumed in immediate contact with the work under treatment, than which there cannot be more favorable conditions for economizing fuel.

* Read at the Summer Meeting of the Institution of Mechanical Engineers, held at Birmingham.

Telegraphic Improvements.—G. W. Trabue reports in the *Journal of Telegraphy* his experience in using lightning rods along the several telegraph lines in Western Tennessee to prevent accident and damage from lightning. On several of the routes in that part of the State, lightning rods were used, averaging two for every mile of wire for about 400 miles. He reports that the number of interruptions from lightning does not seem to have been lessened. No case of damage to a pole bearing a rod is reported, but the lightning has damaged poles in the near vicinity of these rods. Mr. Trabue thinks that to prevent lightning striking in between the rods, the latter should not be further apart than five or six poles. He intends to experiment with rods on every fifth pole on some of the lines under his direction. He also reports facts which seem to disprove the theory that the liability to damage increases as the number of wires decreases, as he shows that in several cases the lightning damaged poles bearing from four to seven wires, while lines with less wires in the immediate vicinity suffered no damage at all. A new joint for gutta percha covered telegraph wires is mentioned with approval by electric experts. It was devised by Willoughby Smith, and is formed by removing the coating from the two ends to be united, and joining the cleaned wires by the "bell hanger's twist" without the use of solder. The twist is warmed and covered with the insulative material, and while warm is placed in the lower half of a small wooden block about three inches long and one inch wide, fitted internally with a groove for the wire, widening in the middle into a niche about an inch and a half in length for the reception of the joint. While the compound is warm the upper half of the mold, corresponding exactly with the lower one, is placed on the top, and by means of a clamp screwed down until the two wooden surfaces meet, and while in this position the two pieces of wood are held together by half a dozen ordinary brass screws. The joint is simple, and can be made easily by comparatively inexperienced hands.

Sheet Metal Cornices.

BY A. O. KITTREDGE.

Sheet metal cornices are made of such a variety of patterns, of such a wide range of sizes, and are required to be placed in such a diversity of situations, that the methods of construction must needs vary from time to time. The choice of workmen, the habits of mechanics and other incidental causes, often affect the shape and style of work, as well as the considerations above mentioned.

The diversity of styles of cornices is such that they have few parts in common. Very many designs, however—indeed, a large proportion of the styles employed—correspond as far as having moldings continuous through their length. All are supported by projecting brackets or lookouts. The question of joints and shape and material of lookouts, together with construction of the latter, are almost the only features which can be discussed in a general way.

PUTTING UP A GALVANIZED IRON CORNICE ON WOOD SUPPORTS.

The accompanying cut (Fig. 1) shows at a glance the parts and joints in a sheet metal cornice as ordinarily constructed.

The lower flange of the foot molding is constructed with a downward projecting member, which serves the double purpose of a gauge in setting the molding, and of a cover for any small inequalities and irregularities in the brick work. The joints between the foot molding and the frieze pieces, and between the frieze pieces and the modillion course, or dentil course above, are made by extending the flange of the

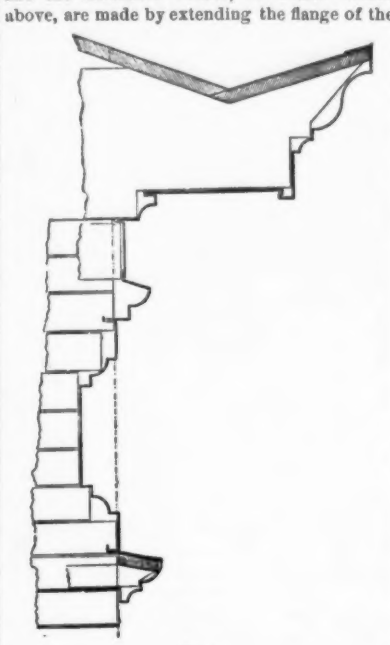

Fig. 1.

ower of the two pieces, with a small edge turned up, into the wall sufficiently far to receive a bearing of brick. The upper flange is of proper dimensions to extend into the wall against the edge of the lower. This construction forms a ready gauge for setting correctly. The joint is finished by riveting through the two flanges when in proper position relative to each other, and by afterward turning over the edge on to the seam, thus making it water-tight. The location of joints between moldings in cornices is determined very much by the dimensions of the cornice and by the design. Sometimes the plancher and bed molding are formed in one piece, and occasionally they are separate. A better job is ordinarily made of fastening the bed molding to the brackets, and of completing the inside miter of the bracket moldings when the bed molding is handled detached. The joint between the plancher and crown molding is ordinarily formed in the drip—a downward projecting edge being turned on the inside of the drip member attached to the crown molding.

The following cut (Fig. 2) shows a slightly different profile, constructed for a building without a gutter, but with the same general arrangement of parts and joints:

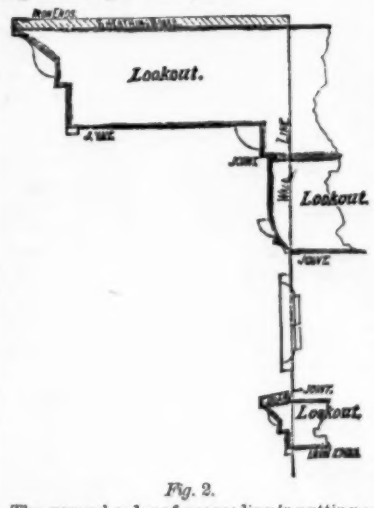

Fig. 2.

The general order of proceeding in putting up is as follows:

The foot molding is first set by means of lookouts and a board which is nailed to the top of them. The brick work may then be carried up to the top of the lookouts so as to hold this course firmly in position. If the frieze is to be brick, the brick work may be carried higher—say, half-way to the top of the brackets. The object of a board in connection with the lookouts in a foot molding is to secure a firm and even foundation upon which to rest the brackets, which cannot be obtained unless there is some adequate bracing in the foot molding. After the foot molding has been set, as above described, the brackets are next placed in proper position, by nailing on to the board in the foot molding through flanges which are provided at the bottom of each, or by any other convenient method. If the cornice has frieze pieces, they are next set, being slipped down behind the brackets and joined to them by clinching the edges provided for the purpose. The brick work is next carried up to the top of the frieze, and the straps or wires for holding the brackets are carried back through the wall and fastened. In the case of a brick frieze, the brackets are sometimes fastened by running a wooden block into them and nailing through their sides. This block is extended back into wall, and takes the place of a brick. It is sometimes called a wooden brick. After the brackets are set and the brick work is carried up as high as the top of the frieze, the various bed moldings are put on, being fastened to the brackets by seaming, clinching or riveting, as the nature of the forms may admit. In the case of a modillion course or dentil course, the modillions or dentils are always attached to the moldings before the moldings are placed in position. Dentils and modillions are attached by riveting, seaming or clinching and soldering. The neatest job is made by clinching, as in that case there are no outside flanges to be left exposed. The plancher is laid directly upon the brackets and modillions, and is fastened to them by cutting through and clinching. After the brick work has been carried as high as the plancher, the lookouts supporting the gutter or the roof, as the case may be, are run out. The plancher is attached to them either by nailing direct, or by lugs riveted to the plancher and nailed to the sides of the lookouts. The latter plan, although costing a little more, is preferable in all cases. After the lookouts have been set and the plancher attached to them, the crown molding is put on by hooking against the drip edge of the plancher and drawing back against the face of the lookouts, to which it is attached by either nailing direct or nailing through riveted lugs, as described in connection with the plancher. A supplementary lookout is extended into the modillion course whenever the projection and size of the moldings admit of it.

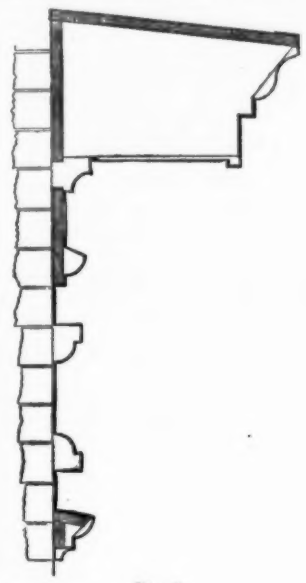

Fig. 3.

Trusses and stop-blocks are constructed with flanges to the profile of the moldings of the cornice. These flanges are thoroughly riveted and soldered in position. They project only about 2 inches, and are intended to slip inside of the moldings, which are to be riveted to them.

Joints between lengths of moldings are made by lapping and riveting. Carefully worked moldings can be joined in this way so neatly as to hide all indications of a seam when finished and viewed from a short distance.

The necessity of carefully prepared wood work, correct as to size and shape, and set to line, is apparent. No matter how thoroughly a cornice may be made, if the supports upon which it is fastened are out of position or irregular, the symmetry of the structure is lost. Too great care cannot be exercised in guarding this point.

The general manner of attaching or putting up a cornice, as above described, progressing as the brick work goes up, and with flanges extending into the wall at each step, constitutes the cornice a permanent part of the building, and is the manner calculated to give the best satisfaction. It frequently happens, however, that it is desirable to put cornices upon buildings whose brick work is already completed. The method of procedure in such a case (Fig. 3) is to attach lookouts by means of digging into the wall, or by nailing into plugs driven between the bricks. The flanges of the molding are all turned so as to lay against the face of the wall, instead of running into it. By careful workmanship a satisfactory job can be made in this way. It should never be used, however, save where it is impossible to do better.

There is no part of cornice work, as ordinarily termed, wherein good workmanship is more urgently required than in putting up; and we might also add, there is no part which is more generally neglected, or trusted to inferior or incompetent workmen. As ordinarily constructed, the putting up of a galvanized iron cornice is so simple a matter that it should have all the attention and care it requires, that the credit of the business may be maintained.

STRICTLY FIRE-PROOF CONSTRUCTION OF SHEET METAL CORNICES.

While a galvanized iron cornice, as ordinarily constructed and put up on wood lookouts, will resist fire for a long time, and is no doubt far preferable to a wood cornice, a strictly fire-proof cornice is only obtained by the use of metals for supports and fastenings, to the entire exclusion of wood. As to general principles of construction, joints, connections, fastenings, &c., there is very little to be said of special application. There is little change from the general methods indicated in our description of the construction upon wood lookouts. Instead of carrying in parts on the building, a method employed by some mechanics is to build the cornice in sections upon the ground and hoist to the top of the wall in that shape. While this plan works well in many cases and under some circumstances, we believe from observation that it is not entirely satisfactory. We recommend in all cases the building in of galvanized iron work. In the case of fire-proof construction we advise a similar plan as described under the preceding heading. In this case an outside scaffold will be required, but we are certain that the superior quality of work obtained thereby will more than compensate the extra expense. Bar iron supports and braces are used, formed to the general contour of the parts. The moldings are run through solid behind all brackets and modillions. Brackets and modillions are attached by means of riveting through outside flange. Moldings are fastened to the braces and supports by means of button-headed bolts. Anchors or ties are extended through the wall with an end bent down for a fastening. A glance at the annexed cut, Fig. 4, shows the general arrange-

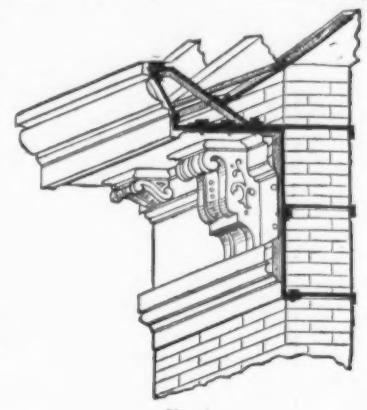

Fig. 4.

ment of parts, and also indicates a superior method of constructing a gutter—a matter to which we also desire to call attention.

The pitch of the gutter is provided by variations in the bend of the brace supporting the back. By attaching it higher up, upon the front brace, it will readily be seen the bottom of the gutter will be correspondingly raised. Sometimes the front brace is constructed with a slot, sometimes with a series of holes, and sometimes each set of braces is worked to a pattern and positive joints and fits made. The latter plan is calculated to give the best satisfaction. The outer edge of the gutter and the upper flange of the crown molding are seamed together over a T iron or L (angle) iron, which also serves to keep the outer edge of the cornice and gutter in shape and straight. A heavy, common iron lining is provided throughout the gutter for supporting the tin, which is attached to the braces by cutting and bending narrow flanges around them. The tin is shaped to the general form of the gutter, and depends for fastening upon its connection at the outer edge with the crown molding, and upon the roof flange.

Beside the construction herein indicated, very frequently cast iron lookouts to pattern are employed, in which case the pitch of the gutter is allowed by strips attached to the lookout, or by the construction of the roof as a whole.

Sheet metal cornices constructed upon iron supports are susceptible of equally good workmanship and finish as those put up on wood. Greater care probably is required in making fittings and joints, but there is no reason why equally good results are not attainable. Fig. 5 shows a section of an improved construction for light bar iron work in fire-proof cornices, lately patented by the Kittredge Cornice and Ornament Company, of Salem, Ohio.

The methods of putting up and the condition in which work should be shipped to the building will be better understood by careful perusal of the description of construction drawings, which will be given at another time.

Careful attention should be paid to the wants and preferences of outside mechanics as to the construction of work. The man that is to handle the work upon the building, and who has had previous experience in such matters, is entitled to be heard upon all questions of joints and parts.—*The Metal Worker.*

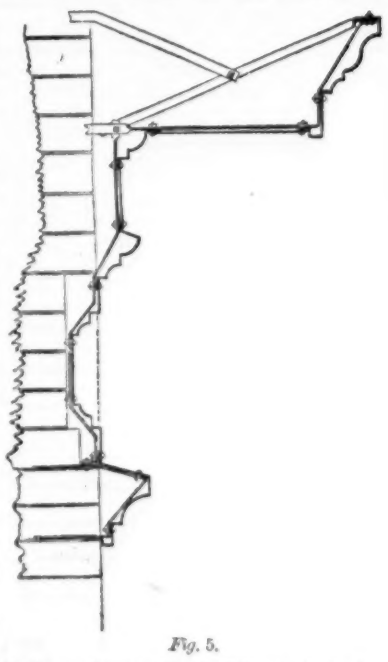

Fig. 5.

Centennial Notes.

THE MILTIMORE CAR AXLE COMPANY.

The improvement in railroad mechanics, which we are about to describe, is the result of over five year's constant labor to the inventor, Mr. George W. Miltimore, of Janesville, Wis. Beginning with his first model of a compound axle, patented Oct. 10, 1871, through a series of improvements designed to simplify and perfect the invention, it is brought down to the patent allowed July 18, 1876, a most thorough trial of every change suggested in the construction. A complete test of every patented improvement has been made under the supervision he expense of the company. This has been done by building several sets of trucks, making alterations on them as stated, and then running them under passenger coaches in the daily express travel of a busy railroad. The primary object of the invention is to obviate the sliding of wheels on the rails, inseparable from the use of the rigid axle, whether caused by curves, inequalities in the track, or differences in the circumference of the wheels. The manner in which this is accomplished is as follows: The inner axle of steel, or cold rolled shafting, the same size throughout, passes at each end into the cast iron pedestal blocks, where it is securely fastened by the steel bolt passing through both axle and block, the axle being thus free from torsional strain needs only to be of sufficient size to support its proportion of the weight of the car without undue springing. Around the axle is a revolving sleeve composed of the wrought iron pipe with cast iron ends, forming the wheel seats on which the wheels are loosely mounted, being held to gauge on the inside by the shoulders of the casting, and on the outside by the cast iron nut screwed on to the end of the sleeve and fitting into and against the hub of the wheel. In both ends of the sleeve and attached to it are the oscillating cylindrical boxes of brass that turn with the sleeve and form the only points of contact between the sleeve and axle, the bearing surface being on the under side instead of the upper as in the ordinary construction. The object gained by casting the boxes with a ball projection on the outside is to allow them to oscillate freely and conform to the spring of the axle, insuring a perfect bearing the whole length of the box and preventing wear at the ends. The box ring fits closely the outer half of the ball, and the sleeve casting is turned to fit the inner half, leaving the ends sufficient room to oscillate. The manner in which the axle performs its work is this: The wheels, though loose on the sleeve bearings, carry the sleeve round with them on account of the much lighter frictional resistance in the smaller inner bearing where the brass boxes revolve round the axle. Consequently, on a straight track with wheels of equal circumference there is no motion whatever on the outer bearing between the hub of the wheel and the wheel seat, but when by reason of a curve or inequality in the track or wheels, one wheel is required to move farther or faster than the other, either wheel is perfectly free to accelerate its motion on the outer bearing independent of and not interfering with the movements of its mate or of the inner bearings. This is accomplished without throwing any torsional strain on the sleeve, for when the wheel is forced slightly out of the perpendicular by the flange striking the outer rail of curve, and the hub cramps on the wheel seat, it at once turns the sleeve with itself, gaining the increased motion in the opposite hub where there is no cramp. The pedestal blocks with the oil reservoirs and the oil drip are one casting, and can be made to fit any pattern of truck now in use. The end of the axle passes into the oil reservoir, a cork held in place by a washer and hollow screw plug forming an oil tight joint. The oil from the reservoir flows directly through the horizontal oil passage in the axle and the vertical hole connected with it into the bearing, the flow being regulated by a steel plug that plays loosely in a vertical hole. In case it is desired to use grease instead of oil the plug is dispensed with and the grease is fed directly to the bearing; should it feed too slowly from cold weather, the moment a slight degree of warmth is developed in the bearing it is communicated at once to the lubricant in the axle, and causes it to flow in increased quantity before the box can possibly warm enough to do harm. The oil reservoir being closed by a tight screw cap, it is impossible for dust or sand to reach the oil or bearings, and the facilities for examining and replenishing the oil reservoirs are equal to any oil box now used. A slot is cut through the thread on which the nut is screwed to the sleeve to supply the wheel seat with oil, centrifugal motion forcing an ample supply from the oil that passes out of the outer end of the oscillating box against the inner face of the nut. The remainder of the waste oil after passing through the nut is caught in the oil drip formed by coring out the lower portion of the pedestal block, and can be drawn off by taking out the screw plug. This prevents the oil from dripping over the wheels, saving much labor in cleaning the trucks as well as economizing in oil. The strong points claimed for this invention are: "The durability of all its parts; the greater life-time of, and the ability to use, larger wheels; the almost entire absence of wear on the axle; diminished wear on the road bed; less liability to accidents; less expense for repairs; perfect lubrication and economy of oil; entire freedom from hot boxes, and the large saving of motive power." In order to present a practical illustration of the working of the Miltimore axle, the company have equipped seven cars of the West End Passenger Railway Company, which can be daily seen in use in the Centennial grounds. The exhibit of the company is located in Machinery Hall, D 69, where further information can be obtained on application.

HARRISON'S PATENT RAILROAD AXLE

for making curves of any radius. This is another simple but very useful invention, and appears to possess all the advantages claimed by the inventor. It is an ordinary axle, with bearings on the center and end. A sleeve is securely attached by cap and bolts, allowing each wheel to be independent of the other. One wheel is fastened by hydraulic pressure on one end of the axle, the other is made fast by the same power on the sleeve, thus giving a free and independent movement on curving. The axle is solid from oil box to oil box, and even stronger than the present axle. The independent movement takes place from the center bearing, thereby allowing the axle to make a perfect circle in its own rotation, and with little or no wear and tear. This exhibit is of great interest to railway men, and will doubtless receive their careful attention. Mr. Harrison is to be found in Section E 9, E 72, Machinery Hall, and will give any further details that may be required.

THE HENDERSON IRON.

Among the exhibits of American iron manufacturers at the Centennial Exhibition in the Main Building, is a case from James Henderson, of Hamburg, Pa., containing specimens of iron manufactured by the Henderson process, of which he is the inventor, which goes to show that the process is applicable to make good quality of iron from any pig iron; it embraces iron made from a great variety of pig irons, including the most inferior cinder and pyrites pig, and the hematites of Barrow, England. These specimens show that cinder pig iron will make as good wrought iron by this process, as that made from superior pig iron, and that any pig iron can be used by it for the production of steel. The process has been successfully applied in Pennsylvania at the Hamburg Iron Works for the past year, under the immediate supervision of Mr. Henderson, and the quality has been uniform, equal to the iron exhibited by him, and as will be seen by tests appended thereto, is equal to the highest class Swedish and Yorkshire irons. Among the exhibits are cotton spinning rings, pistol frames, a fluted cotton roller, and other articles received from manufacturers who constantly use this iron in their productions, and who have hitherto been supplied from Norway, Lowmoor, Taylor's and John Marshall's gun iron. The exhibits demonstrate the success of the process by producing a uniform quality of the highest class, and which for various uses has never been surpassed, more especially for boiler plates, carriage axles, forgings and articles requiring high finish, which have to be case hardened. The iron is chiefly remarkable for its purity, toughness and great tensile strength. It was tested at the Columbia School of Mines for the Tomlinson Spring and Axle Company, who were desirious of ascertaining its value as compared with Lowmoor iron for carriage axles. The tests are as follows:

	Lowmoor.	Henderson's.
Elastic stress	32,000 lbs.	37,000 lbs.
Ultimate stress	49,480 "	6,000 "
Extension in 24 in.	1⅝ in.	4·215 in.
Transverse strain broke at	12,200 lbs. per sq. in.	Uncracked.

The appearance of the fracture of the Henderson iron presented as clear a surface as the best of Norway, and nearly as dense as a fine grade of steel.

Tests of boiler plates half inch thick by Kirkaldy show the following results:

	Krupp's.	Yorkshire.	Henderson's.
Elastic stress	25,416 lbs.	27,913 lbs.	25,750 lbs.
Ultimate stress	51,287 "	46,358 "	55,413 "
Stress for fractured area	75,999 "	56,087 "	82,235 "
Contraction of area	31·4 per ct.	17·3 per ct.	32·4 per ct.
Extension at 40,000 lbs.	4·54 "	5·88 "	3·81 "
Extension ultimate	21·3 "	13·4 "	23·7 "

The Yorkshire plates were furnished by Lowmoor, Bowling, Farnley, Monkbridge, Cooper & Co. and Taylor for competition with Krupp. The Henderson iron was made from cinder pig iron. Experiments made to ascertain its resistance to bulging stress and bending hot and cold gave perfectly satisfactory results, not showing any cracks in either of these tests. In respect to toughness and strength the iron is superior to best Norway for wire and other uses where great softness is not required. Samples of wire billets are exhibited. The wire is No. 33 gauge, and was drawn by Washburn & Moen Mfg. Co. from billets supplied by Mr. Henderson, made at Hamburg. Its properties will be seen by the tests given below, with tests of W. C. Crown, Swedish, a superior iron for wire exhibited at the Exhibition, given for comparison:

	W. C. Crown.	Henderson's.
Ultimate stress	42,145 lbs.	52,605 lbs.
Stress for fractured area	132,510 "	126,450 "
Extension ultimate	37·7 per ct.	40·8 per ct.

The Henderson billet is seen to be 24 per cent. stronger than the Norway and 9 per cent. tougher. The iron is also extensively used for drop forgings, for which purpose it is equal to the Norway iron heretofore used. The iron before referred to is fine grained homogeneous iron. Mr. Henderson also exhibits a soft, tough, fibrous iron for general purposes which is equal to Swedish charcoal puddled iron, and is sold at prices of good American puddled irons. This iron, as compared with the Motala Swedish iron in the Exhibition, both tested by Kirkaldy, is as follows:

	Motala.	Henderson's.
Ultimate stress	47,708 lbs.	48,050 lbs.
Stress per fractured area	96,365 "	100,843 "
Contraction of area	48·5 per ct.	52·3 per ct.
Extension ultimate	28·9 "	28·3 "

MORRIS, TASKER & CO.

(Limited), Philadelphia. This firm have three distinct and separate displays in Machinery Hall, all of which will be found useful and interesting to the trade. Their chief location is Section C 3, at which place they have erected a pavilion, composed of iron pipes, tubes and coils, which is both unique and graceful in appearance. The space is surrounded by a railing of iron tubes, and the dome, which consists of coils for boiling soap, is in one piece, 580 feet in length and 1¼ inches in diameter, the whole supported by four immense tubes, 30 feet in length and 4 to 8 inches in diameter. Within the space the display consists of every variety and size of vulcanized rubber coated, galvanized and plain tubes, radiators, brass work, polished and unpolished, valves, faucets, cocks, also taps, dies, &c. A very graceful vase, containing the firm's circulars, &c., is made from a coil (for distilling purposes), and other articles are also arranged very tastefully, producing a most pleasing effect. The adjoining display is equally interesting, and consists of galvanized, plain and vulcanized rubber coated fittings for gas, water and steam. They also display a variety of tools, such as taps, dies, reamers and drills, screwing stocks, wrenches, tube cutters and tube expanders, and two sizes of screwing machines. The hydro-extractor, or wringing machine, is also a prominent feature in this exhibit, and, we are informed, is largely used by hotels, woolen mills, dye factories, &c. Of special interest, however, is the display of cast steel gauges, which are made from the finest quality of steel, and finished most beautifully. The third exhibit is also in Machinery Hall, Section A 9, and is chiefly devoted to gas machinery, but our space will not permit a detailed notice; the trade, however, by giving it an examination will find much to interest them, and Mr. Watson or Mr. Clark are always on the spot, and will give the most obliging attention to visitors.

THE BILLINGS & SPENCER CO.,

Hartford, Conn. This firm make a fine display of their specialties in Machinery Hall. The location, adjoining the Corliss engine, is a very prominent one, and the arrangement of the exhibits exceedingly tasteful, consequently they receive, as they fairly deserve, a goodly share of public attention. The display comprises all descriptions of steel and iron drop forgings, beside screw-plates, dies, sewing machine shuttles, parts of guns, pistols, &c. A screw-plate shown by this firm is one of the best finished pieces of work we have seen, and is forged from the best wrought iron. The arrangement for holding in the dies is novel and new; the two gibs that hold the dies in position swing in and out; by turning the screw from the top die and pressing on the round pin at the lower edge of the plate the gibs will recede into the plate, leaving the dies free to drop out. The pressure of the screw upon the dies always keeps the gib in place, as the lower die rests upon the right angle portion of the gibs projecting from the pin upon which they swing. The screw drivers for gun and machine makers drop-forged from the best cast steel are also very handsome, and beautifully finished. Their exhibit of clamp, die and common lathe dogs forged from bar steel and hardened, is also worthy of attention, and will commend themselves to every machinist and tool maker. The Packer ratchet drills are forged from the best Norway iron with steel pall and gear, and are said to be the original genuine ratchets, so long and favorably known to the public. They have been adopted by the United States government and are in use in navy yards, on board steamships and in all the principal machine shops in the United States and Canadas. This firm also manufacture the Barwick patent wrench and pipe tongs, having purchased the entire stock, machinery, patent rights and good will of the Barwick Wrench Company, of Boston. This is claimed to be the best wrench and most useful tool upon the market for all purposes. It is pipe tongs, screw wrench and coupling plyers all in one tool, and will do work that a common tongs, screw wrench and coupling plyers will not. This wrench, it is said, will not crush a pipe or change its diameter. Several tests have been made, and in every instance with completely satisfactory results. They are adapted to any shaped object, round, square, flat or oval, they are always ready for their work, without altering or changing any of their parts, and a useful and compact tool for any machinist's bench; in fact, every place where nuts, bolts or piping is used it is invaluable. There is also displayed marlinspikes, calkers' tools, clinch rings, parts of sewing machines, guns, pistols, &c., all of which are calculated to maintain the reputation of this well known firm.

PANCOAST & MAULE,

Philadelphia. A large collection of the most approved apparatus for heating by steam and hot water will be noticed at Column 75, Section D, Machinery Hall, which are specialties manufactured by the above firm, who contract to furnish apparatus in detail for heating buildings of any capacity. Their vertical tube radiators, which are arranged in great variety on a pyramidal stand, are so constructed as to overcome obstacles that have hitherto interfered with the perfect working of such radiators. The hollow base has a diaphragm cast in the center running the entire length, dividing it into two compartments; the top of the upper compartment receives the radiating tubes of 1 inch wrought iron pipe, each closed at the top by welding, rendering their leakage impossible. From the diaphragm proper a series of wrought iron pipes of one-quarter inch in diameter, rise inside of each radiating tube, and constitute the steam supply. Steam being turned into the radiator, it enters the base in the lower compartment, and is at once carried up each small feed pipe and delivered at the top of the respective radiating tubes. By this means the air which must be expelled before circulation can be secured is instantly forced by the pressure of steam behind it down the tubes until it reaches the dividing diaphragm, and it then perforce seeks the outlet at the opposite end of the upper compartment, through which the condensation also passed off. The improved house heating boiler which is placed at the front of their exhibit, is manufactured of cast iron in concentric sections, and bolted to a central column. This boiler presents a large amount of the most effective evaporating surface, and being sectional, has great strength. All joints are machine faced, and give no trouble from leakage. This form has the advantage of being easily erected and quickly taken apart for cleaning or repairs. It can be used with or without casing up in brick. When bricking is dispensed with the price of setting is greatly reduced. The boiler is connected with a cage of cast iron indirect radiators, showing the arrangement of the heating surface at the base of the flue in wooden section of building. By this system of heating (indirect radiation) the heating surface is all located in the cellar, where the cages of radiators are cased in, and each cage supplied with cold air from the outside, which air, having been carried over the heated surface, is distributed to all parts of the building by means of flues and registers similar to those used for furnaces. Pancoast & Maule also furnish and erect complete systems of green-house, laundry and culinary apparatus, with engines, boilers, pumps and the many requisites to their equipment. The exhibit made by this firm is very complete and worthy of an attentive examination.

A. B. SHIPLEY & SON,

of Philadelphia, in Agricultural Hall, have the finest exhibit of its class in the Exhibition. The whole of the fishing tackle shown by them was made by their own workmen in the "City of Brotherly Love." To those who are experts in the piscatorial art the display, which is one of very great beauty, is of unusual interest, not only in itself because of the fine workmanship and excellent material, but on account of its being entirely an American production. Artistically the exhibit has been managed with much taste. In the matter of artificial bait as flies, minnows, crabs, shrimps, and the like, the display is very fine. The principal rod in the collection is an exceedingly fine one in four joints; it is of bamboo, with gold tipped joints, ivory handle gold mounted, and has a highly decorated gold reel. The rod is worth considerably over a thousand dollars. The rods known as split bamboo, shown by the firm, are all built up or made from pieces. To make these rods, the bamboo is split into small sections and the best of them, united by cement, are built up into a solid rod, which is much more elastic than the bamboo in its original form, and stronger since only the very best part of the bamboo is employed in the rod. The joints are neatly trimmed down and strengthened by being wound with strong fine cord. The result is, of course, a very light, strong and elastic rod. The firm are the only ones in Philadelphia who make a rod from the green heart-wood of Ireland. The rods of this kind are very beautiful. Floats are made from the Central American tupula wood; they are lighter than those made of cork. Lines and fishing tackle and rigging in considerable variety are also shown. As a practical illustration of the good results of the exhibition, and showing how well American work is appreciated abroad, we find that this house have made business connection with several Russian firms.

THE BRADLEY MANUFACTURING CO.,

Syracuse, N. Y. This firm have one of their rubber cushioned hammers in operation in Annex No. 1 to Machinery Hall. It is a source of considerable attraction and interest to the trade. The following description covers the main features of the invention: The length of stroke is easily attained by the use of an adjustable eccentric. By their method of raising and lowering the husk, dies varying an inch in thickness can be readily used without shimming up either end of same, as has been the former custom, thus preserving the keyways and hammer bolts, an advantage which every practical man will see at once. In securing the hammer head to the helve, rubber cushions are used beneath the nuts and collars of the bolts, which absorb all concussion and prevent the loosening or breaking of bolts at the same time that they act with the rubber springs in perfecting the elasticity and flexibility of the blow. The action of the helve in connection with the oscilator and rubber cushions, is said to be the nearest possible approach to that of the smith's arm that has ever been attained by the use of mechanical ingenuity. The bearings of the main shaft are made of the finest bronze, and all the others of the best quality of anti-friction metal, and the action of the broad steel eccentric is regulated by the use of a universal joint connection which prevents the possibility of binding or heating. The foundations of the anvil block and the main bed are wholly independent of each other, and yet are so united that nearly the entire jar from the blow of the hammer is transmitted to that of the anvil block alone. So accurately are the parts adjusted and so equally is the dead weight of the blow distributed through the parts intended to receive it, that one can scarcely identify the strokes of the hammer when under the most rapid and violent motion, even if the hand is held on the working parts. The power is applied by means of a foot-treadle, running around the bed of the hammer in such a manner that the operator standing in front or on either side can by a gentle pressure of the foot bring the tightener in connection with the belt on the drive pulley, and thus vary the stroke in proportion to the pressure applied. On removing the pressure the brake at once acts on the balance wheel, bringing the hammer to a stop instantly, and with the helve up, as it never stops with the dies closed, a feature which every hammersman will appreciate. This is, doubtless, one of the most accurate and powerful hammers for all kinds of work that is offered to the trade—in proof of which the makers inform us, that parties who are using them, are duplicating orders as fast as they require new hammers.

JUST PUBLISHED.

WOOLLETT'S

VILLAS AND COTTAGES;

Or, Homes for All.

A Book for the People.

Reduced view of Perspective Plate 28.

Showing Plans, Elevations and Views of Twelve Villas and Ten Cottages.

Being a collection of Dwellings suited to various individual wants, and adapted to different locations.

Designed by

WM. M. WOOLLETT,

Fellow of the Am. Institute of Architects.

LIST OF ILLUSTRATIONS.

Design. No.	Plate. No.	
		VILLAS.
1	1	Basement, 1st and 2d story plans of Frame Villa. Scale indicated on plate.
1	2	Perspective view.
2	3	Perspective view, Frame Villa House. Plans similar to Design No. 1.
3	4	1st and 2d story plans of a Brick Villa. Scale indicated on plate.
3	5	Front elevation of Villa. Scale indicated on plate.
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		COTTAGES.
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10	40	Perspective view.

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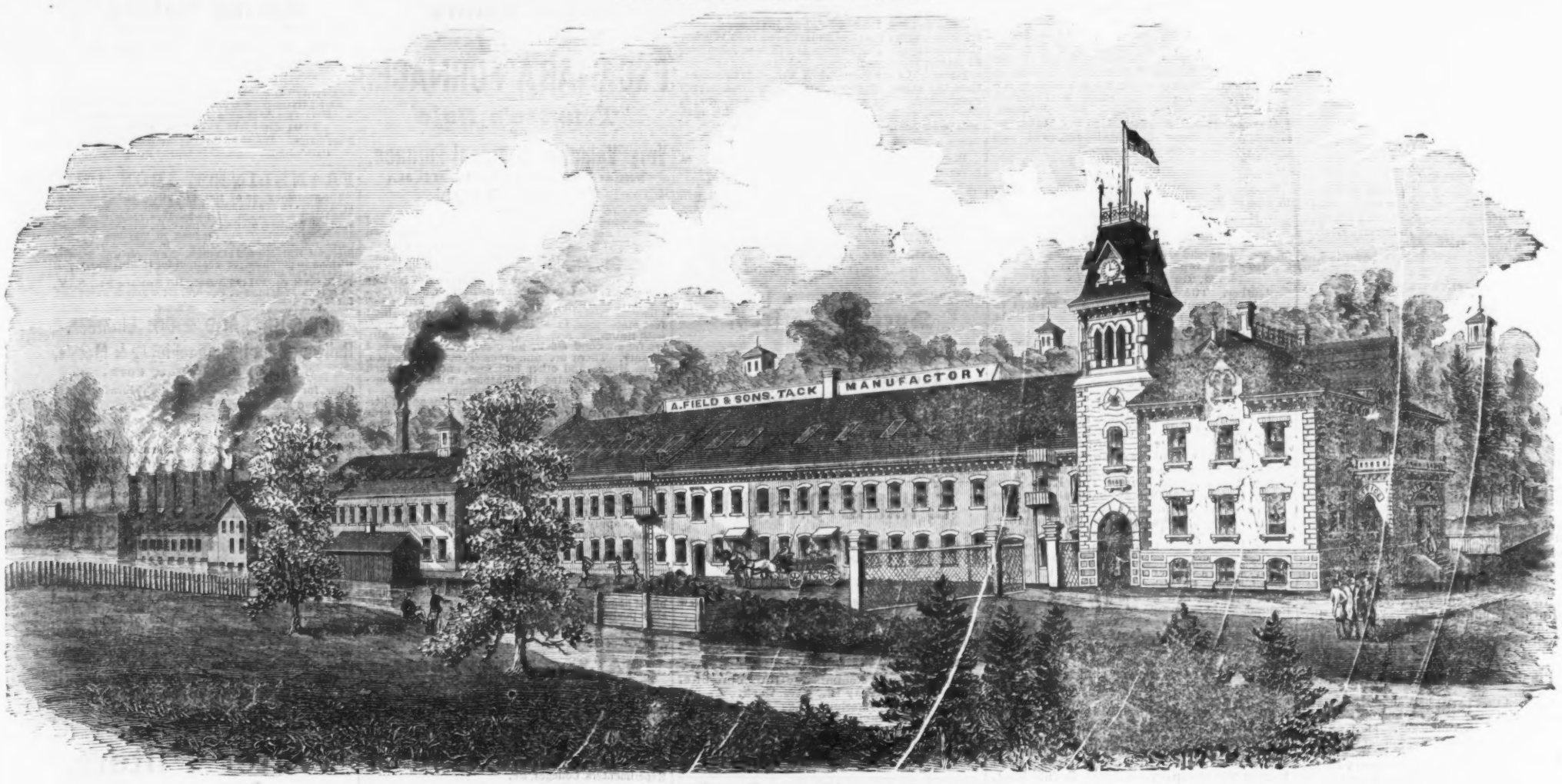

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BUSINESS ITEMS.

NEW YORK.

J. P. Cheney & Co., of Sheffield, England, proprietors of cutlery works, have decided to remove their business to Syracuse.

The Jagger Iron Co., of Albany, have put one stack in blast. They have two stacks, each 60x16, with a capacity together of about 25,000 net tons. The Olcott Iron Works are still in the hands of the receiver.

NEW JERSEY.

The Danforth Locomotive Works, at Paterson, have discharged a number of men. Most of the work of changing engines from six feet to the standard gauge for the Delaware, Lackawanna and Western Railroad has been completed, and the work remaining on hand is not pressing.

PENNSYLVANIA.

A new industrial establishment is getting ready to go into operation at Pottstown, called the Keystone Tack Works. The articles to be manufactured are tacks, brads, finishing nails, shoe nails and cigar box nails, all to be made of the best Swede charcoal and American iron.

The depression in the iron business at Coatesville causes fifty houses in that borough to be tenantless.

The Glendon Iron Company have recently blown out one of their furnaces, and we are informed the remaining one will be blown out in the course of a few days.

The Andover Iron Company are making preparations to blow in one of their furnaces, and will probably be in operation in about 10 days.

Messrs. J. Billerbeck & Co. are making important alterations at their screw factory, Seventeenth and Venango streets, and expect to be in operation about the end of this month. They have put in several new machines and will make all sizes of wood screws.

Westerman Iron Company, Sharon, have 29 boiling furnaces running. The bar mill is running steady by day on orders, and occasionally at night, working billets for Atlantic Mill. The guide mill is on double turn. The hoop mill is on single. The plate mill was on double last week, with plenty of orders ahead. One blast furnace is on.

It is reported that parties are about to engage in drilling a well near the old Sharon Furnace for the purpose of obtaining gas. They expect to drill from 2000 to 5000 feet in order to obtain it; hopes are also entertained that in sinking the well it may lead to the discovery of oil, from the fact that a considerable quantity of oil was found some time since within 50 feet of the surface on the Hoagland farm, opposite the furnace.

Geddes, Young & Co., founders and machinists, Sharpsville, have dissolved partnership, Mr. Young retiring.

Hiram Veach has disposed of his interest in the Fanny Furnace, Middlesex, to some gentleman in Erie, and there is a rumor prevalent that it will soon be fitted up and blown in again.

On August 23, No. 1 of the Shenango Furnaces was filled up, and, it is fair to presume, is now in blast.

The Greenville Rolling Mill is running double turn.

Mr. P. L. Weimer has received a patent for his new engine, from the United States Patent Office, at Washington, D. C.

The new chain factory, at Sharon, is running 16 fires, producing on the average one ton of finished chain every day. It is expected that the works will be enlarged to admit of 80 fires.

There are no less than 60,000 men employed in this State in the work of mining and shipping anthracite.

PITTSBURGH AND VICINITY.

Reese, Graff & Woods have just closed a contract with the New York and Cleveland Gas Coal Company, by which the coal company is to deliver to the Fort Pitt Iron and Steel Works 1,000,000 bushels of coal, which will keep those works running double turn until about May next.

The Pittsburgh Forge and Iron Works, in the Ninth Ward, Allegheny City, are running double turn since September 1.

The Pittsburgh Bolt Works resumed operations Monday.

The Pittsburgh and McKeesport Car and Locomotive Works are running 11 hours a day, and also working a night shift from 7 to 11 o'clock.

On Wednesday week, the largest steel plate ever produced in this city was rolled at the Black Diamond Steel Works, of Messrs. Park, Bros. & Co. The plate measured 26 feet long by 4 feet 2 inches in width and three-quarters of an inch in thickness.

The salamander at the Lucy Furnace was broken with dynamite.

The lamp chimney makers were notified that unless they went to work on or before September 9th, the grate bars would be drawn and an additional reduction of 10 per cent. made. The blowers say they will not work at the wages offered.

The stove works of Messrs. A. Bradley & Co. are running to their full capacity, and the firm have not had a more active or promising trade for 10 years past.

The contract for building the new rolling mill of Lindsey & McCutcheon, in place of the one recently burned, has been awarded to Messrs. Riter & Conley. The length of the superstructure is to be 243 feet, and its width 147, of iron columns, iron trusses, and roofed with corrugated iron.

The proprietors of the Sligo mill, Messrs. Phillips, Nimick & Co., have refused to sign the puddlers' scale, and the works are still idle. The Puddlers' Association, at a meeting Saturday, indorsed the action of their Sligo members in refusing to work without a scale.

The Keystone Bridge Company have taken contracts for the following iron bridges on the Galveston, Harrisburg and San Antonia Road: Guadaloupe River, one span 258 feet, two spans 158 feet, one span 128 feet; Ciblo River, two spans 158 feet, two spans 88 feet; Salado River, two spans 128 feet, two spans 88 feet; Tio Geronimo, one span 128 feet; Tongo Creek, one span 128 feet; Dietz Creek, one span 88 feet, all to be completed this year. These will be the first iron railway bridges in Texas.

Evans, Dalzell & Co. are putting up a new furnace for generating gas from naphtha, which is to be burned in the furnaces for tube making. Four dollar oil will somewhat interfere with this.

Lewis, Oliver & Phillips are building an addition to their foundry on the South Side.

The Union Mills are crowded with orders in their specialty of girders and other engineering irons.

The Pittsburgh Bolt Works will be put in operation early next week.

Vaughn & Fink, of Louisville, Ky., have purchased 600 tons of iron from Carnegie Bros. & Co., of Pittsburgh, to be used in the construction of bridges on the Louisville and Nashville Railroad.

The work of relining and repairing the Lucy Furnace is being done in a very thorough and substantial manner. The bottom hearth and lower section of the bosh is of Mt. Savage brick. The bricks in the bottom are shapes laid in a circle, the top row to a square brick 15 inch by 9 inches in the center. The second row to a circle composed of four segments with a radius of 18 inches, and the rows beneath composed of alternate rows as above. This breaks joints and makes a hearth that should never come up. The first nine rows from the top are 6 inches thick, then four courses of 4 inch and under this three courses of common 9 inch brick. Twenty-seven courses of the bosh are Mt. Savage 4 inch and 42 courses Harbison and Walker's. In the old furnace the columns which support the stack were placed on a foundation plate resting on sandstone. The stone cracked and crumbled and broke the plates. The stone has been removed and courses of fire-brick used instead.

OHIO.

Buckeye Furnace is in blast and making about 13 tons of No. 1 iron per day.

It is reported that the Falcon Nail Mill, Niles, will resume operations next week.

The *Advocate* says: "The No. 1 blast furnace of the Cleveland Rolling Mill Company was blown out for repairs not long since, and will be completed, ready for business again, in September. The company's new hoisting house for elevating material to feed said furnace is being built of iron, ten feet higher than the old one, with a view to further enlargement. It will be inclosed with galvanized iron and externally embellished with iron-clad paint. Improvements at their establishments have followed each other in rapid succession since the mills were commenced in the year 1857, when the burgh was but a very little village. Now their establishment constitute a good sized lively town of itself. They have a large quantity of pig iron on hand. There is little doubt but they will be kept busy all winter, giving constant employ to more than 2500 men."

The *Trade Review* says: "The King Iron Bridge Company, Cleveland, have all they care to do at prevailing prices. They retain a full complement of mechanics, some 130 in number. Among their recent contracts is one for 600 feet of truss bridge for Lewistown, Pa., two arch bridges, one of 520 feet and the other of 300 feet for Iowa, and a smaller one ordered for the city of Philadelphia. Considerable overhauling is now going on in the new wire mill of the Cleveland Rolling Mill Company. A new engine is also being placed in position. This engine's cylinder is 18 inches, stroke 30 inches. The driving pulley, which will also act as fly-wheel, weight nine tons. Capacity of the engine is estimated at from 180 to 200 horse-power, sufficient to drive all the machinery in the new wire mill when all the frames are in."

The bed plate for the Milwaukee elevator engine, being built at the Cuyahoga Works, Cleveland, is an exceptionally fine casting for so large a one. It weighs 11 tons.

The Lake Shore rail mill of the Cleveland Rolling Mill Company continues in full blast. Work on the new water works for use of the mill has been stopped for the present.

The terms on which the workmen of the Niles' Iron Company have taken the mill are a lease for one year at a certain sum. Most of the parties concerned were formerly workmen in the mill. The company are first to put the mill in good repair, and, as it has been idle for over two years, it will require about a month to do this.

It is reported that the workingmen of the Falcon Iron and Nail Works have bought $30,000 worth of the stock of that company.

One of the Graffton Furnaces, Leetonia, is in blast, the other is being entirely relined. It is nearly completed, and will blow sometime this month.

Running on 52 bushels of coke and 12 bushels of stonecoal, the Alice Furnace, Ironton, has made a daily average of some 60 tons per day of a very superior grade of iron, two-thirds of the make being foundry metal.

WEST VIRGINIA.

The Top Mill, Wheeling, was to have resumed operations Monday.

The La Belle Nail Mill, Wheeling, started up Friday of last week.

The Riverside Nail Works are putting in a new engine, and adding generally to their puddling capacity. Heretofore they have frequently had to lease the old Washington Mill when they were crowded with orders, but they propose hereafter to have their puddling capacity equal to the capacity of the rest of the mill.

INDIANA.

The works of the Ohio Falls Car and Locomotive Company were sold on the 31st ult. under foreclosure of a mortgage given to secure the creditors granting an extension after the panic of 1873. The entire property was purchased by the Ohio Falls Car Company with a capital of $150,000 and a new organization composed of the stockholders and creditors of the old company, the co-operators being James H. McCampbell, Samuel A. Hartwell, Samuel Goldback, J. L. Smyser and Joseph W. Sprague. The officers of the old organization have been retained by the new, which is prepared to commence active operations immediately.

MISSOURI.

In addition to 40 narrow gauge cars for the Burlington and Northwestern road, the Missouri Car and Foundry Company, at East St. Louis, are building 10 more cars for the same road; 100 box and coal cars for the Atchison, Topeka and Santa Fe; 100 cars for the Kansas City, St. Joseph and Council Bluffs, and 30 woodenware box cars for Samuel Cupples & Co., of St. Louis, for the California trade.

KENTUCKY.

The Norton Iron Works, Ashland, is rapidly reducing its stock of nails, having shipped 7200 kegs a short time since, and expect to resume operations in about two weeks.

Racoon Furnace is again in blast.

The Ashland *Journal* says: "The Thomas W. Means, on Saturday last, had one of the best trips for this season. From this place and Ironton she had eight barges coal, 10,000 kegs of nails, 550 tons pig iron, 50 tons bar iron, 20 tons cotton ties and 120 tons Burgess steel."

Work on the Princess Stonecoal Furnace, Boyd county, continues. The Coalton coal vein is opened about 106 feet above the level of the furnace tunnel head; the vein combining from 3 feet six inches to 3 feet 10 inches workable stonecoal, which will be conveyed by 1102 feet inclined plane to a place near to and level with the tunnel head, and thence hauled with mules in to the stock house. The old blowing machinery of the Buena Vista stack will be used at this furnace, and is now being overhauled and trimmed up at Ironton.

We have noticed much activity at the Riverton pig iron depot, during the last few days. Not less than 400 tons of pig metal have left there for Pittsburgh, and large shipments were also made to ports below.

Hunnewell Furnace blew out Wednesday, finishing her blast with a trial of coke made from the Turkey Lick stonecoal. This experiment cannot be considered a success, the make being reduced to nearly one-half and the iron itself being rather milly, which may be attributed mainly to a lack of blast, the machinery, though plenty sufficient for a charcoal furnace, lacking the power necessary for stonecoal or coke reduction. The coke itself, also, was not a very superior article, having for several months been exposed to rain, etc. As soon as a new hearth will have been put in, the furnace will at once resume to run on charcoal iron.

The inwall of the Princess (Boyd county) and the fire-brick for its Whitwell hot blast are being turned out by the Scioto, O., Fire Brick Company.

TENNESSEE.

John Pearce, Louisville, has just completed six steel boilers for the Chattanooga Iron Works, Chattanooga. The boilers are 32 feet long and 42 inches in diameter.

Messrs. Lewis Scofield & Co., Chattanooga, have the stack of their merchant iron mill nearly completed. The engine is set, the rolls are in position, and from all appearances the mill will soon begin operations.

ALABAMA.

But one of the Shelby Furnaces is in blast at present, making cold blast iron of a superior quality.

The Woodstock Furnace is in blast. It will soon make a run on spiegel, and then blow out.

PACIFIC COAST.

The iron works at Oswego, Oregon, will close down in about six weeks, and it is rumored that a company from Ohio are negotiating for their purchase.

Special Notices.

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Best Attention Given to the Introduction into any Markets of Europe of any Wares, Merchandize, Patents, &c.

SPECIAL NOTICE
A new style of
MEN'S SINGLE GUNS,
in addition to the former line of A. Simon's, Liege, now offered.
SILESIAN SHEET ZINC,
Imported by
LOUIS WINDMULLER & ROELKER,
20 Reade Street, N. Y.

TO INVENTORS AND MANUFACTURERS
The 45th Exhibition of the American Institute will open September 6th; Machinery will be received after August 14th, other goods after August 28th. Increased awards and a Special Gold Medal for this year. For particulars, blanks, etc., address "General Superintendent American Institute, New York."

Specialties of Wrought, Cast, or Sheet Iron or Brass,
Made to order in a SUPERIOR MANNER, AT LOW PRICES, by the
CORRUGATED METAL CO., East Berlin, Conn.

DISCOUNT SCREW LIST.
Revised to date..... 75c
Wrought Hinges and Butts..... 75c
Cast Hinges and Butts..... 75c
Bolts.....75c | Bolts and Files.....1 00
Dayton & Lamberson, 97 Chambers St., N. Y.

Special Notices.

BY THOMAS F. STEWART.
ESCANABA FURNACE.
Trustee's Sale
OF
Very Valuable Charcoal Furnace,
Situate at ESCANABA, MICH.,
AT AUCTION.
The undersigned will offer at Public Sale, at the Chamber of Commerce, in the city of Pittsburgh, on
Thursday, September 21st, 1876,
at 2 o'clock p. m., the very desirable property known as the Escanaba Furnace, with all its appurtenances, together with about Thirty Thousand Acres of Woodlands, very carefully selected by experts, on which have been erected 49 Charcoal Kilns. The Furnace is 12 feet Bosh, 51 feet Stack, Iron Truss Roof, thoroughly Fire-proof, with Buildings, Foundations and Hoisting Machinery for a second stack, all constructed in the best manner. There are numerous Tenement Houses, Store House and other buildings, and a large dock on the bay, adjoining the Furnace, with very superior facilities for obtaining limestone.
In addition to the realty is a large amount of personal property, comprising about 15,000 cords of Wood, a large quantity of Limestone, Iron Ore, Charcoal, Goods in Store, Wagons, &c., &c., which will be sold in conjunction with the realty.
This property must be sold for account of creditors. It is probably one of the best Charcoal Furnace Properties in the country, the woodlands affording an almost unlimited supply of hard wood, and must, in the near future, become very valuable. It presents rare attraction for capitalists. For particulars apply to Trustee, at Pittsburgh, who will furnish schedule of personal property.
J. R. McCUNE, Trustee.
THOMAS F. STEWART, Auctioneer.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,
IRON AND STEEL,
Care of P. O. Box 813, Bridgeport, Conn.

HALL & HARBESON,
Manufacturers of
Chemical & Physical Instruments,
191 Greenwich Street, N. Y.
SPECIALTY.—Bunsen's Gas Burners, for all heating purposes; Bunsen's Improved Gas Combustion Furnaces, with 10, 15 and 25 burners. Fine Brass and Metal Work made to order for Metallurgists, Chemists, Experimenters, Colleges, &c.

TO LET,
A Light, Handsome Office.
Possession Immediately.
HERMANN BOKER & CO.,
101 Duane Street. N. Y.

NOTICE! POND'S TOOLS.
The undersigned has assumed the Personal Property, including accounts, finished and unfinished Machinery, good will &c., connected with the manufacture of Machinist's Tools as conducted by Mr. Lucius W. Pond since 1847, and will continue the said business at the old stand, cor. Union and Exchange Sts., Worcester, Mass., under the name of David W. Pond, Successor to Lucius W. Pond.
CARD.—Having assumed the business mentioned above, I solicit Inquiry and Patronage, with guarantee that present standard of Workmanship, and quality of Machinery shall be maintained. A large quantity of New and Second-Hand Tools, All Styles and Sizes, For Sale at Low Prices. Send for list of second-hand tools. Store at 98 Liberty St., New York, will be discontinued from Feb. 1, 1876, and all sales made from manufactory.
Respectfully, DAVID W. POND,
Successor to Lucius W. Pond.

Situation Wanted
by a married man (33). Competent and willing to act as buyer, salesman, or in any capacity; 17 years' experience; willing to locate in any part of the country. Address Experience,
Office of The Iron Age, 10 Warren St., N. Y.

MANUFACTURERS
desirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "IRON," published every Saturday, at 99 Cannon Street, London, E. C.
Scale: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

Steel Castings.
Solid and Homogeneous. Guaranteed tensile strength, 25 tons to square inch. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price list to
CHESTER STEEL CASTINGS CO.,
Eveline St., Philadelphia, Pa.

ATTENTION is invited to the fact that the Labels used on my Goods, were entered according to Act of Congress in the year 1876, in the U. S. Patent Office.
IN ADDITION to Auger Bits, I make a full line of Extension Lip, Car, Machine, Dowel and Hand Rail Bits, also of Boring Machine, Carpenters' and Millwrights Augers. All my goods are solid CAST STEEL, and perfectly made by means of my Patent Machinery.

SPECIAL NOTICE.
I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. There is a special claim on each of the Dies. All persons infringing on said patents will be held responsible to the extent of the law. Russell Jennings.
Deep River, Conn., Sept. 7, 1874.

Wanted—A Partner,
In a foundry and machine business, already well established. Locality splendid and healthy.
A practical man with means is wanted to join a practical man who is already well established.
Address CAR WHEEL FOUNDRY,
P. O. Box 134, Selma, Alabama.

Briesen's Patent Agency
FOR SECURING INVENTIONS, TRADE MARKS, &c., IN AMERICA AND EUROPE,
No. 258 Broadway, New York.
A. V. BRIESEN.

VENTILATING & STEAM HEATING.
A thoroughly competent engineer, with extensive experience in the above line, desires employment.
Address M.,
Office of The Iron Age, 10 Warren St., N. Y.

Special Notices.

A. PURVES & SON,
Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Boilers, Copper, Brass, Tin, Babbit Metals, Foundry Facings. Best Quality Ingot Brass.
Cash paid for all kinds of Metals and Tools.

FRANKLINITE IRON ORE.
The average assay of this ore yields 69·7 oxide iron, 17·05 oxide of manganese, no sulphur or phosphorus. The large percentage of manganese renders this ore valuable for steel making or mixing with other iron ore. 10 to 12 per cent. of this ore used in puddling furnaces cures red short and cold short in the iron; mined at Sterling Hill, Sussex County, New Jersey. Parties wishing to purchase or contract for future delivery of this ore, can address
DIXSON & TROTTER, 35 Spruce St., N. Y.
200 tons residuum of this ore, after zinc is burnt out, for sale.

ALLIS BULLARD & CO. (Limited),
Railway Supplies, Machinery & Metals,
14 Dey Street, New York,
Offer for immediate delivery the following list of Tools and Machinery, viz:
One 12 x 36 inch Greene Cut-off Engine, in perfect order; one Brown & Sharpe Universal Milling Machine; one do No. 1 Screw Machine with lot of Tools; one 8 inch Pratt & Whitney Shaper; one do. 16 inch Planer, and 13 inch x 4 feet Lathe; one Pond Planer, 22 x 5 ft.; two Fowler Presses, and lot 15 and 18 inch Lathes; all in excellent condition.

EXPORT TO RUSSIA!
Having established ourselves in this city for the sale of American Machinery, Hardware, Agricultural Implements and Technical Products generally, we beg to solicit correspondence with manufacturers desirous of being represented in Russia. Familiar with the wants of the country, and, as civil engineers, brought in contact with the industrial interests, we are enabled to introduce successfully American products to the trade.
Address HARTOCH BROS.,
Kasanska 46, St. Petersburg, Russia.

NOTICE.
Water Filters.
Battersea, London, July 1, 1876.
We beg to advise the trade and public that we have appointed Mr. H. R. Mensing, 62 Water St., N. Y., sole agent for the sale of our well known Silicated Carbon Water Filters.
SILICATED CARBON FILTER COMPANY.

PIG IRON and ORES.
J. F. JAMES, Chattanooga, Tenn.
Special attention given to orders from Southern Foundries. Advances made on consignments of Pig Metal and Warehouse receipts given upon arrival in store yard.

DROP FORGINGS.
The Trenton Vise & Tool Works, Trenton, N. J., having increased their facilities, are now able to do all kinds of
Iron and Steel Drop Forgings
in quantities to order at reasonable rates.
HERMANN BOKER & CO., Proprietors,
101 & 103 Duane St., N. Y.

For Sale, &c.

RARE BUSINESS CHANCE.
The best Hardware and Paper Hanging stock in the city of Taunton. Business stand superior to any other, and rent low. Will be Sold at a Bargain. Thorough chance for investigation given.
Address, Box 3465, Boston Post Office,
Or A. W. BANGS & CO., Taunton, Mass.

For Sale.
Hardware Business
in a city of 16,000 to 18,000 inhabitants, near New York, long established, and doing a good business, surrounded by a fine agricultural district. Satisfactory reasons given for selling. Address,
"HARDWARE,"
Office of The Iron Age, 10 Warren St., N. Y.

FOR SALE OR TO RENT.
The valuable property known as the BOONTON IRON WORKS, situated at Boonton, Morris Co., New Jersey, now in complete working order. Also in connection with the same valuable mining properties, adjacent to the above, if desired.
Apply to JNO. CROSBY BROWN,
EDWARD C. LORD,
GEORGE DE FOREST LORD,
Executors of Estate of J. COUPER LORD,
No. 120 Broadway, N. Y., Room 60, Fourth Floor.

For Sale!
Owing to the death of the senior partner, the surviving partner is desirous of disposing of that part of the business of the firm comprising the Stove and Tin trade. Would dispose of the entire business, including Agricultural Implements, Hardware, Paints, Oils, &c., if desired. Terms easy with good security.
L. PEASE & SON,
Hartford, Vermont.

FOR SALE.
An ¾ inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.
Apply to W. W. JONES,
Near the Lehigh Valley Railroad Depot,
Allentown, Pa.

For Sale,
30,000 acres of Iron Ore and Timbered Land, large water powers, furnace and forge producing best quality, at good profit and sale. Accessible to Western and Eastern markets. OWNER,
271 N. Charles St., Baltimore, Md.

FOR SALE,
at 10c. a copy, Weekly Spanish Review and Prices Current. The undersigned is also a Translator from and into the English, Spanish, French and German. Latest Translations made: for the governments of Germany and Spain, Pacific Mail S. S. Co., Walter A. Wood; Morris, Wheeler & Co.; Todd & Rafferty; John T. Dunkin; Fisk & Hatch; R. W. Wilde; Wilson Sewing Machine Co.; J. Hess & Co.; H. Marquardt; M. Echeverria & Co., and Chas. E. Little, New York; Hocking Valley Mfg. Co.; W. F. Potts, Son & Co., Phila.; Atlantic and Pacific Land Co.; B. E. Flemming, Jersey City; Wilder & Co., Savannah, and the Tanite Co.; Stroudsburg ("Emery Grinder"), Abendroth & Root Mfg. Co., to whom he refers.
Estimates furnished of translations and setting up of Spanish, German and French Catalogues for the Centennial.
C. KIRCHHOFF,
Metal Reporter of "The Iron Age,"
Box 3091, New York P. O.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Sept. 6, 1876.

The past week has been one of considerable excitement in Wall street. The feeling has been feverish and depressed, and there has been considerable speculative activity among the "bears" who, emboldened by the success of their attack upon the stocks and bonds of the Central R.R. of N. J., have gone at the entire list and done all in their power to break it down. Thus far their success has not equaled their anticipations, but they have not yet given up the attempt, and with a little encouragement on the part of credulous investors who may be frightened into selling, it is not improbable that they will succeed better than the condition of the enterprises raided against may really warrant. The money market continues easy, with rates on call loans 1 @ 2 per cent. Prime mercantile paper is quoted at 3 @ 4 per cent.

The gold market has been quite steady, and the premium has fluctuated within narrow limits. The following table shows the highest and lowest daily range of the premium:

	Highest.	Lowest.
Thursday	110	109¾
Friday	110⅛	109⅞
Saturday	109⅞	109⅝
Monday	109¾	109⅛
Tuesday	109⅝	109⅜
Wednesday	109⅝	109¾

Government bonds have been firm in gold prices, but weak in currency quotations. General investment securities are dull and firm. Railway mortgages have weakened in consequence of the heavy decline in New Jersey Centrals and other bonds guaranteed by that company. We give below the closing quotations of governments.

In the stock market the feeling, as before noted, has been feverish and unsettled, and prices declined 1@10 per cent., subsequently recovering ¼@3 per cent. The principal dealings have been in Central, of New Jersey, D., L. and W., Lake Shore, Western Union, St. Paul, Rock Island and Pacific Mail. We give below the quotations of active stocks at the close of business to-day. The bank statement shows an increase in total reserve of $2,037,300 made up of $1,195,700 specie and $841,600 legal tender notes. The gain in surplus reserve is $1,524,775, the surplus reserve now being $22,774,550. The following is a comparison of the bank averages for the past two weeks:

	Aug. 26.	Sept. 2.	Differences.
Loans	$254,443,400	$255,823,500	Inc.. $1,380,000
Specie	20,946,500	22,142,200	Inc.. 1,195,700
Legal tend's	56,939,000	57,780,600	Inc.. 841,600
Deposits	226,542,900	228,593,000	Inc.. 2,050,100
Circulation	14,640,400	14,608,800	Dec.. 31,600

The movements in foreign trade for the week are shown in the following tables:

IMPORTS.

For the week ended Sept. 2.

	1874.	1875.	1876.
Total for week	$6,771,208	$5,770,713	$4,467,011
Prev. reported	$275,042,848	$235,717,013	$195,418,893
Since Jan. 1	$281,814,056	$241,487,726	$199,885,904

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anvils	10	$ 87
Brass goods	15	1,938
Bronzes	43	8,907
Chains and anchors	50	3,106
Cutlery	171	23,867
Gas Fixtures	1	873
Guns	57	10,871
Hardware	30	2,641
Iron, pig, tons	98	3,455
Iron cotton ties	93	294
Iron tubes	210	366
Iron, other, tons	121	8,445
Iron ore, tons	355	699
Lead, pigs	1,500	19,167
Metal goods	195	20,654
Nails	4	1,083
Needles	4	2,149
Old metal		3,529
Per. caps	6	813
Saddlery	7	1,216
Steel	529	10,102
Spelter	47,515	9,623
Tin, boxes	13,965	76,477
Tin, 632 slabs	66,544	10,802
Wire	4	437

EXPORTS EXCLUSIVE OF SPECIE.

For the week ended Sept. 5:

	1874.	1875.	1876.
Total for week	$5,907,998	$6,346,165	$6,417,217
Prev. reported	$197,859,492	$167,379,456	$175,342,882
Since Jan 1	$203,767,490	$173,725,621	$181,730,099

EXPORTS OF SPECIE.

For the week ended Sept. 2:

Total for the week	$347,400
Previously reported	39,330,322
Total since Jan. 1, 1876	$39,677,722
Same time in 1875	64,130,429
Same time in 1874	40,717,171
Same time in 1873	39,914,762
Same time in 1873	56,542,170

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. Currency 6s	126½	127
U. S. 6s 1881, reg	117	117¼
U. S. 6s. 1881, con	117¼	118
U. S. 5-20 1865, reg	112¾	113
U. S. 5-20 1865, con	112¾	113
U. S. 5-20 1865, new reg	113	113¼
U. S. 5-20 1865, con	113	113¾
U. S. 5-20 1867, reg	116¼	116¾
U. S. 5-20 1867, con	116¼	116¾
U. S. 5-20 1868, reg	118	118¼
U. S. 5-20 1868, con	118	118¾
U. S. 10-40 reg	114½	115¼
U. S. 10-40 con	115⅝	115¾
U. S. 5s, 1881, reg	115¼	115¾
U. S. 5s, 1881, con	115¼	115¾

The following were the closing quotations of active shares:

	Bid.	Asked.
Atlantic & Pacific R. R. Preferred	1¼	2¼
Atlantic and Pacific Telegraph	15	15⅝
Chicago & Northwestern	36½	37
" " Pref.	59½	60
Chicago, Rock Island and Pacific	104	104½
Chic., Bur. & Quincy	113	113½
Col., Chic. & Ind. Cent.	4	4¼
Clev., Col., Cin. and Indpls.	34½	37
Cleveland and Pittsburgh	91	91½
Chicago & Alton	96	98
Chicago and Alton Preferred	105½	—
Consolidation Coal	—	39½
Canton	25	28
Del. Lack. and Western	81½	81¾
Delaware & Hudson Canal	80	80¼
Adams Express	105	109
American Express	59¼	60
United States Express	60	61
Wells, Fargo & Co. Express	84	84½
Erie	9¾	9¾
Harlem	136½	138
Hannibal & St. Joseph	10½	11¼
Illinois Central	84½	85
Kansas Pacific	—	6
Kansas & Texas	7	8
Lake Shore	51¼	51½
Michigan Central	38	38¼
Milwaukee & St. Paul	31	31¼
" Pref.	66¼	66½
Mariposa	5½	7
" Pref.	6½	7
New York Central	105	105½
New Jersey Central	29¼	29½
New Jersey Southern	⅛	¼
Ohio & Mississippi	11¾	11⅞
Pacific Mail	22	22¼
Panama	126	130
Pittsburgh & Fort Wayne	101	102
Pacific of Missouri	2¾	—
Quicksilver	13	15
" Pref.	18	20
St. L., Kan. City Northern	5¾	5¾
" " Pref.	28	28¾
Tol., Wabash & Western	2⅞	2¾
Union Pacific	61	—
Western Union Telegraph	70⅛	70¼

GENERAL HARDWARE.

Nothing of special interest has transpired during the week; the demand for goods continues fair and a good many buyers, particularly from the South and Southwest have visited this market since our last writing. The orders placed continue to be for the small assortments required for present wants. In Foreign Hardware we hear of some fair orders being placed.

The demand for Nails is steadily improving, and prices are unchanged. We quote 10d. to 60d., $3·10, net. In lots of 200 kegs and over, a concession of 10 cents per keg is allowed.

Sidney Shepard & Co., Buffalo, N. Y., have added to their assortment of Coal Hods two new styles open and funnel patterns, made from best refined smooth finish sheet iron. These goods which are made in a variety of styles of finish, are offered to the trade at 15 per cent. discount from the following list:

Price List of Sidney Shepard & Co.'s New Pattern Coal Hods for 1876.

Plain—Per doz.

Inch	14	15	16	17	18	19	20
Black	$4·25	4·75	5·25	5·75	6·25	7·00	7·75
Galvanized		7·00	7·75	8·50	9·50	10·50	11·50
Bronzed Band	4·75	5·25	5·75	6·25	7·00	8·00	8·75

Funnel—Per doz.

Inch	15	16	17	18
Black	$6·00	6·50	7·25	8·00
Galvanized	9·00	10·00	11·00	12·00
Bronzed Band	6·50	7·00	8·00	9·00
Fancy	7·25	7·75	8·75	9·50

Helmet—Per doz.

Inch	16	17	18
Bronzed Band	$8·00	9·00	10·00
Fancy	9·00	10·00	11·00

They also issue the following revised list for their Patent Palace Coal Hods. These goods are worthy the attention of the trade. They are elegantly finished and ornamented, and will compare favorably with any goods of their class on the market. In their advertisement on the 31st page they illustrate these goods.

Price List of Sidney Shepard & Co.'s Patent Palace Coal Vases.

	Each.
No. 3 A, Black, Green Ornamentation, Gilt and Pictures	$5·00
No. 3 B, Black, Blue Ornamentation, Gilt and Pictures	5·00
No. 3 C, Black, Lavender Ornamentation, Gilt and Pictures	5·00
No. 3 D, Black, Gilt, Scroll and Pictures	5·00
No. 3 E, Black, Heavy Gilt Scroll and Pictures	5·00
No. 3 F, Black, Plain Gilt Stripes	4·50
No. 3 G, Blue, Gilt Scroll and Pictures	5·00
No. 3 H, Black, Drab Ornamentation, Gilt and Pictures	5·00
No. 3 I, French Gray, Brown Ornamentation, Gilt and Pictures	5·00
No. 3 N, Drab, Gilt and Pictures	5·00
No. 4 B, Black, Blue Ornamentation, Gilt and Pictures	5·00
No. 4 D, Black, Gilt Scroll and Pictures	5·00
No. 4 G, Blue, Gilt Scroll and Pictures	5·00
No. 4 I, French Gray, Brown Ornamentation, Gilt and Pictures	5·00
No. 4 N, Drab, Gilt and Pictures	5·00
No. 4 P, Black, Gold Stripe and Scroll	7·50
No. 5 A, Black, Green Ornamentation, Gilt and Pictures	5·00
No. 5 D, Black, Gilt Scroll and Pictures	5·00
No. 5 K, " Crimson Ornamentation, Gilt and Pictures	5·00
No. 5 L, Black, Pink Ornamentation, Gilt and Pictures	5·00
No. 5 M, Black, Yellow Ornamentation, Gilt and Pictures	5·00
No. 5 O, Black, Light Gray Ornamentation, Gilt and Pictures	5·00
No. 5 P, Black, Gold Stripe and Scroll	7·50

Discount 15 per cent.

NOTE.—Price does not include Shovel, Tongs and Poker.

The Ausable Horse Nail Company make a very handsome display at the Centennial, a description of which will be found on the fifteenth page. We are pleased to learn that, although the company are running their works to their fullest capacity, they are still behind their orders.

H. Hammond & Co., Hartford, Conn., quote their cast steel hammers at discount, 12½ per cent.

M. H. Tarbox & Co., proprietors of the Penfield Block Works, Lockport, N. Y., have just issued a handsomely illustrated catalogue and price list of their goods, showing a full line of Tackle Blocks, Sheaves and Block makers' goods. Among the new goods which they illustrate are Norcross Patent Tackle Blocks, Tarbox Patent Wrought Iron Blocks, Tarbox Patent Iron Sheaves, Flanged Iron Bushings, Steel Rollers, Pump Boxes, Lizards, etc. The book is handsomely printed on tinted paper, and the goods are illustrated and described in a very comprehensive manner. It will be mailed free on application. H. B. Newhall, No. 11 Warren street, is their agent in this city.

The letter of "Western Jobber," published in our last issue, has called out the following replies:

TO WESTERN JOBBER: I notice your letter of last week in *The Iron Age*. You say—drawing it very mild—"scarcely a hardware jobber is making more than expenses," and you state the cause of it is the drumming system.

Having stated the evil, you ask "who will remedy it?"

It is not my purpose to "step to the front," but to suggest that the parties who caused the evil, and who are now united in a strong organization are the proper persons to come to the front in a body, resolve to do, then do it. If the Western Hardware Association—of which I assume by your progressive manner you are a member—cannot agree on a subject of such vital importance, you would hardly expect individual action by an EASTERN JOBBER.

To the Editor of The Iron Age: Your correspondent, "Western Jobber," is like Artemus Ward's kangaroo, "a moral and amoosin' cuss." Because he has a wart on his nose he wants to cut his head off, and suggests that everybody else shall go and do likewise. He tries to believe such decapitation will be popular. Oh, yes! I'd like to see the statistics for the last ten years of the business he is now so anxious to take out of the hands of his travelers, and do it all himself. I wonder how heavy it was until some of these enterprising and indefatigable workers built it up for him; and I suppose he has since—like other houses I wot of—been gradually dropping his men and sending out boys to do a man's work. Well, its no use! they can't do it! In the first place, they don't know enough, and in the next, "gin and billiards" are too tempting, and hard road work anything but fascinating. "Western Jobber" ought to do his large business (I assume it is a large business) at "old time" profits, with only an office boy and a cheap porter. He could sell all the goods himself—of course he could—especially as the customers would be sure to come to town to be sold. I wonder if "W. J." wasn't originally a retailer. His process of reasoning seems to spring from association with small quantities and large profits. The ideas of such men never get out of their mental swaddling clothes. Why, in the old days, before traveling to sell goods became such a feature as it now is, a house that sold $150,000 a year did a large business and made money. Why? Because there were then no *Iron Ages* and no cash payments. Everything was done on "tick" and on confidence, and jobbers frequently made larger percentages of profit than retailers themselves. A merchant brought his quotations from his last big invoice, bought months before, as a guide to do his shopping, and going through the market, kept a memorandum of where they were "met" or "beat," and finally went into his old house, and sitting down on a chair beside one of his principals (for "the boys" then didn't own the trade), read off his memorandum, gave his shipping directions, and extended his old note. The average of profit in such a transaction was usually a good one, being nearly all imported goods sold for the approximate cost of which the ordinary buyer couldn't consult an *Iron Age* and have a criterion to go by from which a 5 per cent. deviation on a half dozen articles would send the house to Tophet. Does the "W. J." expect us ever to get back to those "dark ages." Alas! his hopes are groundless. Such a huppy state of affairs—for Western jobbers—will not take place at a month's notice. Why don't he hire a few travelers as he hires a conveyance, and get the worth of his money every time? Because he has a lot of nincumpoops who are not self-sustaining, is no valid reason why the system of selling goods by travelers is a dead failure. Some travelers sell goods at a minimum of expense, and some don't. I've seen Dominies similarly situated. Some preach to empty pews, and get too much pay in proportion; while others carry bankrupt churches through financial squalls, and are worth all they get and more too. Let "W. J." resolve this maxim: When you've got any kind of help around—whether its in the firm or only on the floor—that don't earn the money he draws, why just let somebody else support him for a year or two.

If I only knew through what section of country the drummers of this "Western Jobber" "cry havoc, and let slip the dogs of war," I could probably name one house in four, which he—through them—is extremely ambitious of selling goods to, and yet they are the very houses which he should leave alone, without any compunctions of conscience. They are houses that are in the habit—although they retail only—of buying direct from manufacturers, and know every time within 5 per cent. how low "W. J." buys his supplies, and so pay him only a proportionate profit. They are better pay on the average than "W. J." is himself, and he wants their trade to help out his annual sales; but I would like to know the mental arguments with which he justifies the sale of 100,000 dollars worth of hardware on which (as he figures his expenses) I know he can and does show a positive loss.

Let him make his drummers stick to these towns, where the resident dealers do not buy in New York, or of the manufacturers; this will lessen his competition to his own kith and kidney in the Western jobbing trade; and if his drummers can't make money for the house on that programme, let them stay at home while he runs out and tries it himself. He must let the N. Y. drummers catch the biggest fish out his way, for our facilities for shaving Western notes are less expensive than any place where "W. J." can possibly have a line of discount.

The Paradise for Western jobbers (who if I remember rightly wanted that valuable organ of the trade abolished, from the columns of which "W. J." says "the buyer can get all the information he wants") is a section of country where *The Iron Age* does not circulate; where rival drummers do not penetrate; where goods are retailed without close competition, permitting "W. J." to make a greater percentage of profits than the retailer; and to cap all, where they pay cash down for everything. The millenium will probably provide white robes for all the Western jobbers before any "Stanley" among drummers will discover this imaginary locality. Yours, "on the road,"
H. O. P.

To the Editor of The Iron Age: The address of "Western Jobber" to the trade, in your last issue, hits a big nail square on the head.

Our whole business has been taken out of the hands of the proprietors and been thoroughly demoralized and well nigh ruined by indiscriminate over anxious travelers. I do not, however, believe you can get anything like a unanimous move to abate or eradicate the curse—not so long as men exist who want to "do it all." Might not this help toward an end: Give each traveler a small salary and a per cent. on the profit of his sales; then if a man makes little for his house he gets but little, as is just he should. If his house makes money by his efforts they will certainly be glad to see him rewarded. My last turn of the crank woke up a few friends, and if reform can be brought about by agitating a little, who will rejoice more than COFFEE MILL?

NEW YORK, Aug. 31, 1876.

To the Editor of The Iron Age—SIR: We note the communication of your correspondent, "Western Jobber," entitled "What ails us," referring to the "drumming system." We agree with him that it is one of the greatest evils now existing in trade; has done more to demoralize it, and injure both manufacturer and jobber, than all other causes combined. To specify all the evils connected with this odious system, and trace them to their legitimate consequences, would require more space than you would probably be willing to devote to the subject, or than we are now prepared to occupy. Every merchant or manufacturer of experience is well acquainted with the evils connected with it. Your correspondent asks who will remedy it? We would reply that the merchant or jobber have it within their power to remedy the evil, and they alone can do it, if they refuse to listen to any personal solicitations on the part of "drummers," the practice will be discontinued. To do this will require organization and concert of action. Should the system progress for the next dozen years at the same rate as the past, the jobbing trade will be among the things that were. Will they now make any effort to prevent this?
MANUFACTURER.

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)

WEDNESDAY, Sept. 6, 1876.

Scotch Pig.—There has been an improvement in the market since the last report, but prices have fallen off again, and are now steady at the decline. The following are the quotations for makers' brands:

Gartsherrie No. 1	64/
Coltness No. 1	67/
Glengarnock No. 1	62/6
Eglinton No. 1	56/

Manufactured Iron remains unchanged.

Rails are in little better demand, and a fair business is doing, but prices are weak. Welsh are quoted £5. 5/ @ £5. 10/.

IRON.

American Pig.—With the exception of about 700 tons No. 1 X, No. 2 X and No. 2 Thomas Irons at full prices, the sales for the week have been confined to small parcels for immediate requirements; in this way we hear of sales of Crane Iron aggregating about 300 tons, principally No. 1, at $22. No large orders have been placed and prospective buyers are more undecided than ever, owing to the decline in the price of coal. Furnace men continue to hold firmly for present rates and it would be difficult to place an order for a round lot at even a trifling concession from our figures. We quote: No. 1 Foundry, $22; No. 2 Foundry, $20; Gray Forge, $19 @ $20.

Scotch Pig.—The demand is limited to small lots. A sale is reported during the week of 100 tons Glengarnock on terms which are withheld. We quote: Coltness, $28 @ $29; Glengarnock, $27, and Eglinton, $26 @ $26·50.

Rails.—In the absence of business we continue to quote Iron at Mill at $39 @ $42.

Old Rails.—A sale of 5000 tons of Old Rails at a private price is reported. We quote as before $21 @ $22.

Scrap.—We quote Wrought Scrap from yard, $27 @ $28.

METALS.

Copper.—Sales for the week sum up between 400,000 and 500,000 pounds Lake Superior, at between 18¾c. and 19c., cash, which is the closing figure. The leading manufacturers have during these dull times secured a supply sufficient to last them till the end of the year, whereas the less important ones have gone on buying only from hand-to-mouth, and seem determined to adhere to this policy. Baltimore Copper has brought 19c., and as it is in scant supply, 19¼c. is now the asking figure. Although many other branches of trade are reported to be more active, metals still remain quiet on the whole. Lower coal, it is true, is calculated to stimulate business in branches in which it is extensively consumed, but the downward course of the gold premium causes many consumers of articles quoted in gold to hesitate, under the impression that a further material decline in the premium may be at hand. The notion that the general tendency of values is against the holding interest, has been rather strengthened by the break in coal and gold, and in the absence of all speculation for a rise in any of the metals, both in this country and Europe, there is great indifference manifested as regards anticipating requirements, hence the comparatively listless state of affairs at a time when the fall trade usually stimulates purchases. The experience of the past three years has bred a conservative spirit, which in due course of time will lay the foundations for a sound revival based on actual consumptive wants, and trade will then fare all the better for it. On reading late European trade reports it will be found that this sentiment is shared over there. The accounts by mail from London are to the 25th ult., when Copper was steady at £70. 10/ @ £71 for Chili Bars. By cable we learn that the latter is now worth £71. 10/, a rise of 10/ during the week, while Best Selected remained at £77. Manufactured remains quiet at 31c. for Sheathing, and 32c. for Bolts and Braziers; Bronze and Yellow Metal Sheathing, 20¾c. @ 21c.; and Yellow Metal Bolts, 26c. @ 28c.

Tin.—A rather improved feeling has been observable in our market during the major portion of the week under review till yesterday, when it dropped off again due no doubt to the less favorable English cable advices. We have many a time insisted that no permanent improvement in the value of Tin could be established as long as the London stock remained unwieldy. We learn by cable that on the first instant it still stood 7777 tons, notwithstanding deliveries of 1919 tons in England and Holland during August. Simultaneously we have accounts by cable from Singapore, where Tin was worth $19·50 per picul with an exchange of 4/4½d.; Penang cabled $18·60. The market at Singapore was quiet, the demand being but limited. On the other hand the stock was small and so were the shipments in progress. Straits, according to the latest dispatch had given way to £71.10/ at London. During the remainder of the current month it is more than probable that London will fluctuate very little in consequene of the Netherland Trade Society's auction taking place at its close, when the further course of the metal will be determined. The society, to judge from its policy during late sales, has resigned itself to meet the market with its Banca Tin, although it may sell little better than Billiton, such being the case, the Dutch auctions have regained their former importance. At the close we cannot quote our market any better than Straits, 17¼c. gold; English refined, 16¾c. @ 16½c.; ditto Common, 16½c. @ 16⅝c., and Banca, 19¼c., all gold, large lots. Tin Plates are quiet. We quote, gold, per box, large lines, ordinary brands: Charcoal Bright, $7·25 @ $7·50; ditto ternes, $6·62½ @ $6·75; Coke Tin, $6·12½ @ $6·25, and ditto ternes, $5·75. There is no change in England, where the markets have relapsed into quietude.

Lead.—Sales for the week have not exceeded 75 tons in lots at 6¼c. @ 6½c., gold, for Common Domestic. The entire market is weaker 6¼c., gold, the closing quotation, being equal to 6⅜c., currency, at which latter reduced figure the West is as yet little prepared to sell delivered here, but will soon submit to it, we dare say. Holders of common foreign Lead, on the other hand, insist upon extreme rates consequent upon the gradual amelioration that has taken place in Europe, where among the warlike nations, Russia is reported by cable to be again an active purchaser. Mail accounts have been received from London to the 25th ultimo, when English Pig commanded £21 to £21. 5/, and Spanish £21. 15/. The cable tells us that the Turco-Servian war may be considered practically ended in consequence of the crushing defeat of the revolted principality. It would be hasty, however, to jump at the conclusion that all danger of a general war is removed. The holders of Lead in Europe are evidently of a different mind, seeing that Russia purchases so extensively. Manufactured continues well supported at 8¾c. for Bar, 9¼c. for Pipe, and 10c. for Sheet, less the usual discount to the trade.

Spelter and Zinc.—The stagnation in the demand for Brass goods, and little activity displayed by consumers of Spelter in consequence thereof, prevent any revival in the demand for the Domestic article for the present, so much so that a large lot could in all likelihood not be placed at anything exceeding 7c., currency, though 7¼c., currency, is still the nominal quotation. Nothing new has transpired in Foreign Spelter, which we quote, nominally, as heretofore, 7c. @ 7¼c., gold. Later accounts from Germany have not reached us, but we hear from London, by mail, August 25, that the market there is firm at £22. 15/ @ £23 for ordinary Silesian, while Zinc sold at £27 at auction, 120 tons changing hands thereat. *Sheet Zinc.*—The market is moderately active but steady at 8¼c. @ 8¾c., gold, for Mosselmann, and 9c. @ 9¼c., currency, for American.

Antimony—Commands at London between £59 and £65, according to brand. Here we are quiet at 15¼c. @ 15½c., gold; the stock is within easy control.

COAL.

There seems to be a little more demand for Coal, and there is, consequently, a better feeling in the market. The results of the auction sale have been accepted, and people have settled down to the new condition of things. The present range of prices are somewhat above those of the sale, and, with the reduction which has taken place in tolls, are sufficiently high to give the producers a small profit. Prices are not, however, settled in all directions, and we hear of many large dealers who have not yet issued their circulars. Many persons are regretting the return to the old system of selling by auction. The basis of their opposition to sales conducted in this way is not so much that the prices realized are usually low, but that trade is demoralized.

The miners seem to have very generally accepted the situation and gone to work, the companies as a consequence will be able to bring a large tonnage to tidewater during the present month. Lehigh line prices are not yet altogether settled, owing to the fact that the rates of toll have not been decided upon.

The Lehigh and Wilkesbarre Coal Company quote as follows at Mauch Chunk:

Furnace Lump	$2·50
Lump	2·75
Broken and Egg	2·80
Stove	3·00
Chestnut	2·50
" No. 2	1·50

The following are the prices of the Lehigh and Wilkesbarre Coal Company at Port Johnson:

	Lump.	Steamer.	Broken.	Egg.	Stove.	Chestnut.
Old Company's Summit	4·00	....	3·60	3·60	4·00	3·30
Honey-Brook Lehigh	4·00	....	3·60	3·60	4·00	3·30
Wilkes-Barre	3·25	3·25	3·50	3·50	4·00	3·30
Plymouth Red Ash	....	....	3·50	3·50	4·15	3·40

The following are the Pennsylvania Coal Company's quotations, as per their circular of the 1st:

	Delivered at Newburg.
Lump, per ton of 2240 lbs	$3·10
Steamer, " "	3·10
Grate, " "	3·35
Egg, " "	3·35
Stove, " "	4·00
Chestnut, " "	3·60

A. S. Swords, of No. 111 Broadway, quotes for Pittston Coal, for delivery at Newburgh, during the month of September:

Lump	$2·90
Steamer	3·00
Grate	3·25
Egg	3·25
Stove	3·90
Chestnut	3·40

The following are the prices of the Delaware and Hudson Canal Company for Coal deliverable free on board vessel at Rondout, N. Y.:

Furnace, Lump, per ton of 2240 lbs	$3·25
Steamer, Lump " "	3·25
Grate " "	3·50
Egg " "	3·50
Stove " "	4·15
Chestnut " "	3·75

The Philadelphia and Reading circular for Coal free on board at Port Richmond, is as follows:

	Broken.	Egg.	Stove.	Chestnut. No. 1.
Hard white ash	$3·00	$3·00	$3·50	$3·00
Free burning white ash	3·00	3·00	3·50	3·00
Schuylkill red ash	—	3·10	3·60	3·00
North Franklin red	4·00	4·00	4·00	3·05
Lorberry	4·00	4·00	4·00	3·05
Lykens Valley	4·50	4·50	4·50	3·50

Edward Gulager & Co., 111 Broadway, quote Lehigh as follows, f. o. b., at shipping points:

Lump	$4·00
Broken	3·60
Egg	3·60
Stove	4·00
Chestnut	3·30

WYOMING COAL.

Broken	$3·50
Egg	3·50
Stove	4·00
Chestnut	3·30

Freights and Bituminous Coal quotations are as follows:

Cumberland, at Georgetown	$3·50 @ $3·75
West Virginia, at Baltimore	4 50 @ 6·00
Kittaning f. o. b., Baltimore	4·25 @ 4·35
Newburg Orrel, at "	@ 4·50
Despard, at Baltimore	@ 4·50
Broad Top, at South Amboy	@ 4·75
Morrisdale, Wigtons	@ 4·75
Cunard	@ 4·75
" at Philadelphia	@ 3·90
Consolidation Coal Co. f. o. b., Georgetown	@ 3·65
Consolidation Coal Co. f. o. b., Baltimore	@ 3·75
In barges at New York	@ 5·50
Maryland Coal Co. f. o. b., Baltimore	@ 4·00
Maryland Coal Co. f. o. b., Georgetown	@ 3·75

FREIGHTS—PER TON OF 2240 LBS.

PORTS.	From Elizabethport, Port Johnson, South Amboy, Hoboken & Weehawk'n.	From Philadelphia.	From Baltimore.	From Georgetown.
Augusta, Me	....	....	....	....
Albany	....	....	$1·75	....
Amesbury, Mass	....	....	....	....
Bangor, Me	$1·00	...	2·00	....
Bath, Me	1·00	....	1·50	$1·50
Baltimore	....	....	....	....
Boston, Mass	·80	1·30	1·45	1·60
Bridgeport, Ct	·70	·95†	1·40	1·40
Bristol, R. I	·85	....	....	....
Cambridgep't, Mass	1·00	....	....	....
Derby	....	....	1·40	1·50
Dighton	....	....	....	....
East Cambridge	*1·00	....	....	....
Fall River	·80	1·25	1·40	1·40
Hackensack	....	....	....	....
Hallowell, Me	....	....	....	....
Hartford	....	....	....	....
Hoboken	·40	....	1·20	1·25
Hudson	....	....	1·50	1·40
Jersey City	·40	....	1·20	1·25
Lynn, Mass	1·10	....	....	....
Middletown	·90	....	....	....
Mystic	....	....	....	....
Newark	....	....	1·50	....
New Bedford	·85	....	1·40	1·40
Newburyport	1·10	....	1·65	1·70
New Haven	·55	....	1·40	1·40
New London	·80	....	1·40	1·40
Newport	·85	....	....	....
New York	·40	·70	1·25	1·30
Norwalk	·70	....	1·40	....
Norwich	·90	....	1·45	....
Pawtucket	·90	....	....	....
Philadelphia	....	....	·90	....
Portland	·90	...	1·45	1·50
Portsmouth, N. H	1·10	....	1·60	1·70
Providence	·80	1·25	1·40	1·40
Poughkeepsie, N. Y.	....	....	....	1·40
Rockland	·90	..	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	1·00	....	....	....
Salem, Mass	1·00	....	1·60	1·60
Salisbury Pt., Mass	....	....	....	....
Stamford	·65	....	....	....
Saybrook	·75	....	....	....
Stonington	·80	....	....	....
Taunton	....	....	....	....
Troy	·65	....	....	....
Warren, R. I	·85	....	....	....
Wareham	....	....	1·45	1·60
Weymouth	....	....	....	1·65
Wilmington, N. C	....	....	....	1·25

* 3c. per bridge extra. † And Sound Towing.

Harbor Freights, 40 cents.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending September 5, 1876:

Hardware.

Althof, Bergmann & Co.
Cases, 11
Alexandre F. & Sons,
Boxes, 1
Boker Hermann & Co.
Wire, bdls., 100
Drexel, Morgan & Co.
Cutlery, cs., 1
Friedmann & Lauterjung,
Mdse. pkgs., 4
Field Alfred & Co.
Mdse. pkgs., 8
Casks, 2
Chains, cks., 11
Nails, cks., 2
Anvils, 5
Graeff & Nevins,
Cutlery, cs., 4
Moore's J. P. Sons,
Mdse. pkgs., 1
Merchants' Dispatch Co.
Arms, cs., 7
Mason John W. & Co.
Wire rope, coils, 10
Pratt E. C. Bros. & Co.
Cases, 3
Spies, Kissam & Co.
Mdse. pkgs., 4
Schoverling & Daly,
Arms, cs., 1
Mdse. pkgs., 5
Semon, Bache & Co.
Gun barrels, cs., 6
Van Wart & McCoy,
Chains, cks., 19
Casks, 5
Mdse. pkgs., 9
Ward Asline,
Mdse. pkgs., 3
Wiebusch & Hilger Hwd. Co.
Mdse. pkgs., 5
Cutlery & hardware, cs., 15
Order.
Arms, cs., 7
Steelware, cs., 3

Iron.

Montell F. T. & Sons,
Scrap, tons, 13; bbls., 3; lots, 1; wheels, 16
Sampson G. G.
Pig, tons, 100

Steel.

Abbott J.
Tires, 8
Brown Wm.
Cases, 13
Bundles, 19
Robbins C. & Son,
Bundles, 119
Cases, 1
Van Wart & McCoy,
Bundles, 161
Woodford W. O.
Cases, 47
Bundles, 14
Order.
Rods, bdls., 226
Bundles, 116

Metals.

Alexandre F. & Sons,
Tin plates, bxs., 5
Byrne Joseph & Co.
Tin plates, bxs., 275
Behr & Steiner,
Lead, bars, 2491
Hamel John B.
Scrap, pkgs., 32
Montell F. T. & Sons,
Scrap, brass, pkgs., 14
Scrap, copper, cks., 1
Meyer Moritz,
Metal, bxs., 2
Naylor & Co.
Tin plates, bxs., 1585
Black taggers, bxs., 50
Phelps, Dodge & Co.
Tin plates, bxs., 7191
Order.
Tin plates, bxs., 1161

OLD METALS, PAPER STOCK, &c.

We have no perceptible improvement to report in the condition of the Old Metal market since last week. There has been a good call for Old Iron, but other articles are in very little request. The Paper Stock market is steadily improving, and the past week has been an active one in some departments. There have been more extensive sales than we have noticed for months, and prices are strengthening. The Rag market continues unchanged from the dullness previously noted. We quote the following as the current purchasing rates:

Old Metals.—Copper, 14c. @ 15c. per lb.; Yellow Metal, 10c.; Brass, 9c.; Composition, heavy, 10c. @ 11c.; Lead, solid, 5½c.; Tea Lead, 5c.; Zinc, 4c.; Pewter, No. 1, 13c.; do., No. 2, 8c. @ 10c.; Spelter, 5¼c., Wrought Iron, $21 per ton; Light do., $12 per ton; Stove Plate, $8 per ton; Machinery, do., $10 per ton; Burnt Iron, $6 per ton.

Rags, &c.—Canvas, Linen, 4¾c. @ 5¼c.; do. Cotton, No 1, 5¾c.; No. 2, 2¾c.; White, No. 1, 5c.; No. 2, 4c.; Colored, do., 2c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c.; Gunny Bagging, 1¾c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Newspaper Stock, 2½c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4⅛ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 2¾c.

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Sept. 5, 1876.

There seems to be a general feeling of hopefulness in business circles, and in many departments there is already a decided improvement. The iron interests, however, do not show any immediate signs of reaction, although there is a steady feeling, and it is probably safe to venture the assertion that we have seen the worst. Some important contracts have recently been closed—one by Baird & Huston, of the Kensington Iron Works, amounting to about $1,000,000, while two other prominent Philadelphia concerns have been successful in obtaining the contract for some 5000 tons of pipe for the Oil Pipe Line, the value of which will be from $400,000 to $500,000. The preliminaries are all agreed upon, and the contract, it is expected, will be definitely closed within a day or two. In some other departments there is also a slight improvement, but the railway interest, one of the most important of all, is very much depressed, as are all the branches connected therewith. The hardware trade is unusually dull, and, although we have a large influx of visitors from a distance, it has no apparent effect on business. The export trade of the city continues its steady growth, and has become an important interest, with an absolute certainty of immense growth in the future. To meet its requirements the Philadelphia and Reading Railway Company have perfected arrangements for the construction of docks and grain elevators at their wharves at Willow street and Port Richmond. It is also intended to employ some of the companies' steamers in the South American trade, and it is believed that a profitable outlet for coal can be found in that direction. Our merchants are evidently thoroughly alive to the requirements of the times, and will not neglect any opportunity of extending their connections.

Pig Iron.—There is no special change of feature to note; the demand is moderately active, and prices firm and steady. We do not hear of any large transactions, but the buyers of small lots are more numerous, and business is pretty well distributed. The decline in coal does not seem to affect the market, and it is not likely to have any disturbing influence upon prices. The business is in a very sensitive condition, however, and any pressure to sell would probably have to be at a concession in price. In the meantime, holders are content to meet the demand as it comes, at about last week's quotations, as follows: No. 1 Foundry, $22 to $22·50; No. 2 Foundry, $20 to $20·50; Gray Forge, $19 to $20, with sales of 500 tons the latter special brand at a considerably higher price.

Ores.—There is no change to note, the offerings f. o. b. at Richmond, Va., are as follows: Magnetic, $4; Specular for Bessemer, $4·50; Selected ditto, 65 to 70 per cent. of Metallic Iron, $5. At Cleveland, Lake Superior, $7, and Republic Mine, $7·50.

Blooms.—There are sellers at the following quotations; market rather weak: Charcoal Scrap Blooms, $47; Charcoal Ore Blooms, $41 to $42; Charcoal Billets of superior quality, from $60 to $62; and Bars for converting into Steel, made of best Champlain Iron, $75.

Bar Iron.—We have no change to report; certainly no improvement. The demand is very languid, with a tendency to weakness in prices, particularly in the lower qualities. The mills are doing very little, not more than probably one-quarter of their full capacity, and yet the demand is quite unequal to production. This refers to every description of manufactured Iron, and there is nothing to show a probability of early improvement, although stocks in first hands must be very light, and if a consumptive demand was to set in it would, for the above reason, be pretty steady and continuous. Consumption is very light, however, hence the depression. We quote the market dull and weak: 2·c. to 2·20c. for Common, and 2·25c. to 2·35c. for best Refined.

Horseshoe Iron.—There is a fair business doing. We quote: 1¼ x ⅝ to ¾, $70 per ton.

Rails.—We cannot hear of any new transactions; business is almost at a stand, and the mills are running entirely on old contracts. The outlook is not encouraging, and some anxiety is expressed in regard to the future. Buyers with ready cash would be able to make contracts very advantageously just now, and it is singular that the low prices now current do not appear to attract attention. In the absence of actual sales we continue former quotations, viz.: $56 to $58 at mills for Steel Rails. Iron Rails attract more attention, but there are no important transactions to report. Small lots change hands occasionally at our quotations, but the aggregate business is unimportant. We quote: $38 to $42 at mills, price according to quality.

Old Rails.—Offerings on the spot are quite light, but buyers say they can supply their needs from other points at $22 or less, delivered here. We learn of sales at higher prices, however, and quote one extra lot sold at $23·50, delivered at Coatesville. The demand is not active, and in case of forced sales low prices would have to be accepted. We quote: $22 to $23; market dull and weak.

Scrap Iron.—There is a steady trade doing, and full prices realized for choice lots. We quote: Cast, $16 to $19; Wrought, $25 to $27·50.

Nails.—There is a fair demand at quotations, but business is not very active. We quote $3·25, with 25c. to 35c. per keg discount to buyers of large quantities.

Tin Plates.—The activity recently noted is not maintained, and business is again dull and dragging. We quote in United States currency as follows: I. C., 10x14, $8 to $8·75; I. X., 10x14, $10·25 to $11; Best Charcoal, leaded, 28x20, $15 to $16; other good brands, $14·25 to $15; good fair, $14 to $14·50; Bright Tin, for cans, &c., $7·12½ to $7·50; good Bright Tin, do., $7·25 to $7·50; Coke, leaded, 14x20, $6·62½ to $7·25.

Lead.—Domestic remains dull and nominal at 7c. to 7⅛c., currency. The stock of Foreign Pig is about 200 tons, and held by one party at 6·87½c., gold. Manufactured is without change. The foreign market has an upward tendency, caused by large purchases, said to be for Russian account. We quote: Bar, 8⅝c.; Pipe, 9⅛c.; and Sheet, 10c., less 10 per cent. discount to the trade.

Shot.—The demand is fair and prices firm. We quote, with 10 per cent. discount, cash in 30 days: Drop Shot in 25 lb. bags, 9¾c.; in 5 lb. bags, 10¾c.; Buckshot in 5 lb. bags, 10¾c.; Bar Lead in 5 oz., ¼ lb. and 1 lb. bars, 8¾c.

Old Metals.—Brass and Copper are weaker. We quote: Heavy Old Copper, 16c. to 16½c.; Light Tinned Copper, 15c.; Copper Bottoms, 14c.; Heavy Red Brass, 13½c.; Light Red Brass, 13c.; Heavy Yellow Brass, 11c.; Light Yellow Brass, 10c.; Heavy Clean Pipe Lead, 6c.; Junk Lead, 5½c.; Tea Lead, Light Paper, 6c.; Tea Lead, Heavy Paper, 5c.; New Zinc Clippings, 4¼c.; Old Sheet Zinc, 4c.; Yellow Brass Turnings, 8c. to 9c.; Red Brass Turnings, 10c. to 11c.; Plumbers' Lead Joints, 6½c.

PITTSBURGH.

Office of *The Iron Age*, 14 Fifth Avenue, PITTSBURGH, Sept. 5, 1876.

Pig Iron.—There has been no change in the general situation since the date of our last report. Business continues quiet. The inquiry is for small lots to supply immediate necessities, as there is a general disinclination to anticipate future wants, while as regards values there has been no change whatever. Apprehensions are entertained that the disruption of the coal stock in the East will cause a decline on anthracite Pig Iron, and that if so it will weaken our market; the probability is that if there is much of this Eastern offered here, it will weaken prices of the common and medium grades, but good Western red-short mill Iron is in very light supply, and there is not much danger of it going any lower, as many of our mills, especially those anxious to keep up the reputation of their products, will pay from $2 to $3 per ton more for the latter than the former. Bituminous Coal Smelted—No. 1 Foundry, $25, 4 mos.; No. 2, $24; Gray Forge, $21 to $22·50; White and Mottled, $18 to $20. H. R. Charcoal—No. 1 Foundry, $27 to $29; No. 2, $25 to $27; No. 3, $24 to $25; Cold Blast Car Wheel, $40 to $45.

Manufactured Iron.—There is a continued fair demand for Sheet and Hoop Iron as well as for most of the leading specialties, but for Bars and most of the regular sizes and makes, business continues dull. However the complaint is not so much in regard to a scarcity of orders as it is about prices, which are being cut to such an extent that there is little or no margin for profit; competition is sharp, and manufacturers will shave close before they will miss a sale, and while there has been no change made by the combination in the rates fixed at Cincinnati, they are not being adhered to. Two cents appear to be the common rate for Bars, although rumors prevail of sales as low as 1·80c. to 1·90c.

Nails.—While orders have not commenced to come forward very freely as yet, the factories are generally in operation working up stock for fall and winter trade, and the outlook is regarded as being favorable. Unlike the Iron trade, prices are being faithfully adhered to, and current rates afford a fair margin for profit, $2·85, 60 days for less, and $2·75, 60 days for 200 kegs and upward, with the usual discount of two per cent. for cash.

Horse and Mule Shoes.—There is a fair business, but no change in prices; 4½c. per lb. for the former, and 5½c. for the latter.

Steel.—The Steel mills are all in operation, and while but few, if any, of them are working up to their full capacity, business is increasing, and there is little doubt but our manufacturers will have about all they can do all fall and winter. It is complained that prices are being cut very close, rendered so by foreign competition.

Scrap.—Trade, both in Scrap Iron and Steel, continues very quiet, and there is not likely to be much change soon for the better. No. 1 Wrought Scrap is quoted $24 to $26 per ton, buying and selling.

Coke—Continues dull, in sympathy with the depression in Pig Iron, and then the disruption of the combination has had a demoralizing effect. Prices nominal at $2·40 to $2·50 per ton, delivered free on cars in Pittsburgh. In consequence of the continued suspension of river navigation there is no movement of Coal South or Westward.

Petroleum.—Trade has been rather quiet during the past week, but while but few new sales were reported, refiners are all busy, having sold ahead of their production a few weeks ago. Notwithstanding, the market has been less active recently, but little doubt is entertained here in regard to prices being maintained; indeed, unless some new territory is opened up a still further appreciation is not improbable. It is estimated that the consumption of the crude article is about 10,000 bbls. per day in excess of the consumption.

Window Glass.—At a recent meeting of the Executive Committee of the Western Association, the price of double strength Window Glass was considerably reduced, in order to enable Western manufacturers to compete with French plate. This was the only change made. Trade is still reported dull.

BOSTON.

SEPT. 2.—*Pig* is without special change. The inquiry since the coal auction has been nowise encouraging. A sale of over 500 tons Gray Forge and Mottled Iron to one of our Cape furnaces is reported by a New York broker at $19, delivered. This since the auction. The market here is unchanged, holders quoting from $21 to $25 for Gray Forge to No. 1. *Bar* is very dull, the small sales made being on a range of $49 to $54. Little lots of common Iron are reported as ordered from furnaces at under $40. *Steel* is listless, and continues quoting the same rates as for the past three months, viz.: American Tool, 14c. to 15c.; American Machinery, 8½c. to 9½c.; Bessemer Tires, 5¾c.; Sweet's Excelsior Tire, 7½c.; English Tool, 15½c., gold. *Copper* is quiet and steady, the holders asking 19½c. to 19¼c., and buyers offering on small lots 19c. For manufactured we quote: New Sheathing, 31c; Bolts and Braziers, 32c.; Yellow Metal Bolts, 26c.; do. Sheathing, 21c. *Lead* is unchanged. The manufacturing companies continue buying as little as possible, getting the bulk of their wants from the junk market, where 6¼c. to 6⅝c., cash, is current. We quote: Pig, 7¼c. to 7½c. for Domestic; Sheet, 10c.; Pipe, 9½c., currency; Tin-Lined Pipe, 16½c.; Bar Lead, 9½c., less usual trade or 10 per cent. discount. *Antimony* quotes nominally at 16c., gold, for Boston spot lots. *Spelter* is just a trifle stiffer on a lower basis, offering in New York at $7·15, and here at $7·25 to $7·30. *Tin* is a little more active and firmer, both here and abroad. Our inside quotations this week simply represent the tone of one holder on a very large lot. We quote: Straits, 17¼c. to 17½c.; Banca, 21½c. to 21⅝c.; Refined English, 17½c., gold. We quote Plates: Charcoal I. C., $7·50; Coke, $6·25 to $7; and Terne at $7·50 to $8, gold.—*Commercial Bulletin.*

CHATTANOOGA.

Mr. S. B. LOWE, under date of Sept. 4, reports as follows: The advance intimated in last report has been fully confirmed, and 50 cents per ton can now be realized over last quotations. Orders and inquiries are frequent from Southern and Western foundries, which, with the home consumption caused by the active operations of every mill within the district (with one exception), and most of them upon double turn, would seem to give a more encouraging outlook for our furnaces. Prices can be quoted about as follows:

COKE.

No. 1 Foundry, extra	$22·00 @ 22·50
No. 1 Foundry	19·50 @ 21·00
No. 2 Foundry	17·50 @ 18·50
Gray Forge	15·50 @ 16·50
White and Mottled	14·50 @ 15·50

HOT BLAST CHARCOAL.

No. 1 Foundry	$21·00 @ 22·50
No. 2 Foundry	18·00 @ 19·50
Gray Forge	16·00 @ 17·50
White and Mottled	14·50 @ 15·50

COLD BLAST CHARCOAL.

Car Wheel Metal	$22·50 @ 28·00
Forge Metal	17·00 @ 20·00
Cast Scrap, Heavy	per ton, 12·00 @ 15·00
Cast Scrap, Light	" 8·00 @ 10·00
Old Rails	" 20·00 @
No. 1 Wrought Scrap	per lb., ¾c. @
No. 2 Wrought Scrap	" ½c. @

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of Aug. 31, report the Iron market as follows: Our market remains the same as last reported. Demand is perhaps a little on the increase, but prices remain low. We quote same as last:

Mo. Stone Coal, No. 1 F'dry	$25·00 @ 26·00—4 mos.
" " No. 2 F'dry	23·00 @ 24·00—4 mos.
" " Gray Mill	22·00 @ 23·00—4 mos.
" Charcoal, No. 1 F'dry	23·00 @ 24·00—4 mos.
" " No. 2 F'dry	22·00 @ 23·00—4 mos.
" " Gray Mill	22·00 @ 23·00—4 mos.
Tenn. Charcoal No. 1 F'dry	23·00 @ 24·00—4 mos.
" " No. 2 F'dry	22·00 @ 23·00—4 mos.
" " Gray Mill	21·00 @ 22·00—4 mos.
Tenn. & H. R. Coke Iron No. 1 F'dry	25·00 @ 26·00—4 mos.
Tenn. & H. R. Coke Iron No. 2 F'dry	23·00 @ 24·00—4 mos.
Tenn. & H. R. Coke Iron Gray Mill	22·00 @ 23·00—4 mos.
H. R. Charcoal No. 1 F'dry	25·00 @ 26·00—4 mos.
H. R. " No. 2 F'dry	24·00 @ 25·00—4 mos.
H. R. " Gray Mill	24·00 @ 25·00—4 mos.
Massillon Iron, No. 1	29·00 @ 31·00—4 mos.
S. Ohio Am. Scotch	24·00 @ 26·00—4 mos.
Mo. Charcoal Blooms	50·00 @ 60·00—4 mos.
" Scrap "	45·00 @ 50·00—4 mos.
Mo. Charcoal Hammered Billets	75 00 @ 80·00—4 mos.
Assorted Bar Iron	@ 2¼ rates.
No. 1 Wrought Scrap	·90 @
Heavy Cast "	·65 @
Light Cast "	·45 @

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Sept. 4, write us as follows: The market continues firm for all grades of Iron, with only moderate sales. The usual time, 4 mos., is allowed on quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$23·00 @ 25·00
" 2 " " " "	22·00 @ 23·00
" 1 Mill, " " "	20·00 @ 21·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	20·00 @ 21·00

HOT BLAST STONE COAL AND COKE.

No. 1 F'dry, from Hanging Rock Ores	$22·00 @ 23·00
" 2 " " " "	21·00 @ 22·00
" 1 Mill, " " "	19·00 @ 21·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	20·00 @ 21·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	19·00 @ 21·00
No. 1 F dry, from Missouri Ores	— @ —
" 2 " " "	— @ —
" 1 Mill, " "	24·00 @ 25·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	35·00 @ 45·00
" " Tennessee Ores	28·00 @ 30·00
" " Alabama and Georgia Ores	28·00 @ 40·00
Car Wheel from Kentucky Ores	28·00 @ 48·00

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Sept. 2, write us as follows: PIG IRON.—The market presents no features of interest, and shows no change from the condition which has marked it for some time past. Prices remain the same, and the volume of business is only slightly increased by a few buyers who have been making their contracts for the season. There are but few furnaces willing to sell more than their immediate necessities demand, and we find buyers more willing than holders to contract ahead. Quotations below remain unchanged:

HOT-BLAST FOUNDRY.

Hanging Rock No. 1, Charcoal	$ ton. $23·50 @ 24·00—4 mos.
Hanging Rock No. 2, Charcoal	22·50 @ 23·00—4 mos.
" No. 1, Coke	23 50 @ 24 00—4 mos.
" No. 2, "	21·50 @ 23·00—4 mos.
" No. 1, Stone-coal	21·50 @ 22·00—4 mos.
Virginia No. 1, Coke	23·00 @ —4 mos.
" No. 2, "	21·00 @ 21·50—4 mos.
Ala. and Tenn., No. 1, Charc'l	23·00 @ —4 mos.
" " No. 2, "	21·50 @ —4 mos.
Red Short No. 1, Coke	26·00 @ —4 mos.
Fannie U. S. Scotch, No. 1	@ —4 mos.
Alice " No. 1	24·50 @ —4 mos.
Southern Ohio Am. Scotch, No. 1	22·00 @ —4 mos.

FORGE IRONS.

Hanging Rock No. 1, Charcoal	$ ton. $21·00 @ 21·50—4 mos.
Hanging Rock No. 1, Coke	21·00 @ —4 mos.
Virginia, No. 1	20·50 @ 21·00—4 mos.
Ala. and Tenn., No. 1, Charc'l	20·50 @ 21·00—4 mos.
Red Short, No. 1, Coke	22·00 @ 23·00—4 mos.
Cold Short, No. 1, Stonecoal	19·00 @ 20·00—4 mos.

CAR WHEEL AND MALLEABLE.

Hanging Rock	$ ton. $40·00 @ 45·00—4 mos.
Southern and Western Brands	35·00 @ 40·00—4 mos.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, 46 and 48 South Charles street, report us the following prices under date of Sept. 5: We are pleased to report a noticeable improvement in trade the past week, but unaccompanied by any change in quotation figures:

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	2¼ to 2 4-10c. $ lb.
1 to 4¾ wide by 1½ to 2 thick	2¼ to 2 4-10c. $ lb.
Round and square, ordinary sizes, from ⅜ to 2 inclusive	2¼ to 2 4-10c. "
Hoop Iron, 1¼ wide and upward	3¾ to 4c. "
Band Iron, from 1¼ to 4 in. wide	3 to 3¼c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick	3¾ to 4c. "
Norway Nail Rods	7 to 7¾c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	15 to 15½c. "
Machinery Steel	10 to 11c. "
Cast Spring Steel	9 to 9½c. "
Homogeneous Steel Plate	9¼ to 10c. "
Perkins' Horse Shoes, per keg of 100 lbs	$4·87½
" Mule Shoes " "	5·87½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per lb.
Globe Horse Nails	23	24	25	26	28c.	per lb.

R. R. Spikes ..... 2¾ to 3c.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of Sept. 5: The Iron market continues dull and depressed, and we see no chance of improvement in the near future. Sales confined to small lots for immediate consumption, and prices favor buyers. We quote:

Baltimore Charcoal	$30·00 @ 34·00
Virginia "	28·00 @ 34·00
Anthracite No. 1	23·00 @ 25·00
" No. 2	22·00 @ 23·00
" No. 3	20·00 @ 21·00
White and Mottled	17·00 @ 19·00

CLEVELAND.

Messrs. C. E. BINGHAM & Co., 25 West Main street, under date of Sept. 4, quote the Iron market as follows, 4 mos. time:

FOUNDRY IRON.

No. 1 Lake Superior Charcoal	$27·00—4 m.
No. 2 " "	26·00—4 m.
No. 1 Anthracite	25·00—4 m.
No. 2 "	23·00—4 m.
No. 1 Bituminous	24·50—4 m.
No. 2 "	22·50—4 m.
No. 1, Cherry Valley Am. Scotch	— —4 m.
B—1 " "	— —4 m.
No. 2, " "	— —4 m.
No. 1 Massillon	25·50—4 m.
B—1	24·00—4 m.
No. 2	21·50—4 m.

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	$27·50—4 m.
No. 4 " "	27·50—4 m.
Nos. 5 & 6 " "	27·00—4 m.

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	$27·00—4 m.

FORGE IRON.

No. 1 Gray	$22·00—4 m.
White and Mottled	20·00—4 m.

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels).

PARIS, August 20, 1876.—*Metals.*—The Metal trade of Europe is still suffering from various causes, principal among which are the heavy losses sustained by capitalists in the manufacture of Iron and all articles pertaining thereto in England and Germany. The widespread ruin engendered in this branch has crippled many resources. The consequence has been a system of consigning to other countries which, in its turn, has undermined values in the latter. In this manner, by degrees stagnation has become general, and Metals have dropped to a point where a curtailment of production is becoming imperative unless consumption intervenes and restores the equilibrium. Now it so chances that consumption is in a healthy condition; that the capacity of absorbing large quantities is fully restored, and that gradually consumers begin to think that prices cannot decline any lower. Under these circumstances we are inclined to think that better times are not remote. *Copper*—Is one of the articles now considered cheap enough to invite investment, and there is, consequently, a better feeling perceptible. We have remained quiet here, but prices have been well sustained. The following are the quotations: Chili bars, deliverable at Havre, 195 francs Common, ditto, 190; Ingots, 195; English Tough Cake, 192; and pure Corocoro ore, 190. There is no feature of note in the Havre market. First brands Chili bars being worth 187·50; Good current, ditto 183·75 to 185; and Lots and Urmeneta, 182·50. Marseilles is unaltered. Red Tokat, 193; small Refined Ingots, 200; Bolts, 245; Sheathing, 235, and Yellow Metal, ditto, 210 to 215. *Tin*—Remains unsettled, the deliveries thus far this month not coming up to expectations. Our own market has, nevertheless, remained steady at 195 francs for all sorts. At Marseilles a sale is reported of 500 slabs Straits at 186 net. *Lead*—The demand for Pipe and Sheet has been tolerably active all over Europe, and coinciding as it did with some government demand, quite an active trade has resulted therefrom, neutralizing the effect of more copious arrivals from Spain. We have thus been rising here, and quote all kinds from 53·50 to 54 francs. Soft, at Havre, may be called 53, and firm. At Marseilles much stiffness has been developed, and the tendency is an upward one: Soft Refined, 50·50 to 51; Second Fusion, 49·75 to 50; Pipe and Sheet, 57; and Shot, 56. *Spelter.*—The season has thus far been a favorable one to producers, who have had no difficulty in selling three months ahead at remunerative prices. There is great firmness here; Silesian, deliverable at Havre, at 59·50 francs; other good brands at Havre and Paris, 59. At Havre the metal is fully sustained at 58·50 to 58·75. No change at Marseilles. The foregoing quotations are all for 100 kilos. *Iron.*—Accounts from the French markets for the week are devoid of interest, and prices are stationary. In the National Assembly 21 members have got up a petition for the removal of the 5 per cent. on freight rates. Merchant Iron is in a good position at Paris, consumers having begun to stock up. First-class Merchant Iron is selling at 180 at the North, which is an improvement. Bar Iron and Beams are more active, but Rails and heavy Sheet Iron are still in a state of dullness. Pig Iron is still, to a certain extent, suffering from the want of animation in the general Iron trade, but in comparison with neighboring markets, our own show a healthy condition. The characteristic of Iron in France is that it is never very sensitive; it follows slowly any advance or decline abroad. *Coal.*—The Coal situation is still much unsettled and unsatisfactory. There is little doing, although prices are lower, and miners' wages will have to undergo a further reduction.

BELGIUM.

(Revue Universelle).

BRUSSELS, Aug. 20, 1876.—*Iron.*—The great adjudication of Coal under tenders to the government has come off, and is to be followed by another important one of railway material, to take place on the 20th instant, for furnishing the State lines. The policy of the government to step in at the precise moment when everything is stagnant among us, and supply itself two years ahead, is a most welcome one. At the same time it will prove a good business transaction, so far as the purchaser is concerned. It is indeed fair to presume that both Iron and Coal on the Continent have touched bottom, and the same, we believe, relates to Steel. *Coal.*—The price at which the government got its Coal on tenders shows a decline of 20 centimes to one franc per ton since the beginning of June. Charleroi is keeping up prices better than Liege. On the whole, it may be asserted that the Coal question has been more easily overcome in our country than anywhere else in Europe. Prices have declined and wages have yielded, yet the entire machinery has

worked with remarkable precision. This is due to the intelligence of our producers, who have been clever enough to shape their policy in accordance with circumstances. They have never attempted impossibilities, and are now in a good position for the advent of the busy fall season.

GERMANY.

(Borsenhalle).

HAMBURGH, Aug. 19, 1876.—*Metals.*—As the great heat disappears there are signs of increasing activity. The severe criticism to which the German display at the Philadelphia Exhibition has been subjected has probably provoked more comment than anything that has come up for discussion in the public prints. It is to be hoped that the lesson will not be lost upon German manufacturers. We trust the system of having cheapness in view principally will be modified, and that the time will not be distant when we shall attain once more excellence compatible with a reasonable profit to the maker. *Copper.*—Business in this line has been more active, the extremely low prices having stirred up speculators. Berlin is remarkably firm at 77 to 80 marks for qualities English and Australian. At Stettin, English is worth 85 to 93. We quote here: Drontheim, 87; Minnesota, 109, and Quincy, 92. *Tin.*—The German markets have relapsed into quietude. At Berlin, Banca ranges between 80·50 and 81, and English between 77 and 77·50. Here Banca is worth from 84 to 85; English Common, 82 to 83, and do. Refined, 83 to 84. The German markets for *Lead* have been less firm than those of neighboring countries. At Berlin, Tarnowitz, Hartz and Saxonian are worth 20·75 to 21; at Stettin, Spanish is quoted 26 to 27, and German, 21 to 23. There is absolutely nothing doing here. German at 22 to 22·50; English, 24 to 24·50; and do. Sheet, 24·50 to 25. *Spelter.*—Firmness is still the characteristic of our markets, but business has somewhat abated just at present. At Berlin good quality Silesian commands 23 marks; special brands, 24; Stettin is inactive at 23 to 25·50. At Breslau, Silesian Union has been paid 21·50. Here we are nominal at 24.

HOLLAND.

(Koch & Vluerboom).

ROTTERDAM, Aug. 22, 1876.—*Tin.*—A sale of note has been effected, amounting to 2400 slabs Banca, at 42⅛ guilders, on the spot. Some transactions to arrive have taken place at 43⅛. The general market, however, still lacks animation.

EAST INDIES.

(Aitken, Spence & Co.)

COLOMBO, July 22, 1876.—*Plumbago.*—The market is quiet, and the demand continues moderate. In view of this, some reduction in values might reasonably be looked for; but with only very small stocks on hand, and Exchange so much in favor of drawers, dealers resolutely decline business at anything under our quotations. *Shipping.*—The Sappho is now ready for sea. *Exchange.*—Rates have hardened during the past week, but the improvement is expected to be only temporary. Credits are to-day worth 1/7⅛, and Documents 1/7⅛. Bank selling rate is about 1/6¾. Private credit rate nominal. Total exports of Plumbago from Colombo and Galle to the United States, from October 1, 1875 to July 22, 1876, 45,632 cwts., against 25,945 in 1875; to all countries, 103,801 cwts.

(Clark, Spence & Co.)

GALLE, July 19, 1876.—*Plumbago.*—Dealers are averse to parting with their stocks at prices offered, still some small parcels have been placed at a reduction on previous quotations, and we now quote Fine Lump, £12 to £13; Chips, £7. 10/ to £8. 10/; Dust, £4 to £5. The Carlotta will receive about 170 tons for London. *Coal.*—No fresh business to report owing to absence of arrivals. The Waterloo (1191 tons) with a cargo of Birkenhead Coal was ordered to Bombay. For Coaling steamers we repeat previous quotations of 46/ and 47/6, free on board for Newcastle and Cardiff. *Exchange.*—Bank's closing rates are: selling 6 months' sight at 1/6¾.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, ENG., August 22, 1876.

THE HEAT,

of which I have spoken in one or two of my previous letters, has been painfully intense during the week, the thermometrical registers showing it to have been of a fully tropical nature. On August 14th we had the maximum temperature for something like 20 years. At Sheffield, 93° (in the shade); at York, 89°; Nottingham, 96°; Cambridge, 95°; London, 93°; and Oxford, 87°, were recorded, thermometers placed in the sun indicating not less than 135°. The results of this abnormal heat are really very serious. We have a great deal of English cholera around us, many of the cases proving fatal if not attended to immediately after seizure, and in all directions people are dying of sunstroke, this being particularly fatal to those engaged in the harvest fields. Resulting from the heat there have also been several terrible thunder storms. One of these arose in Ireland (poor Ireland!) on Friday last, and raged with such intensity that six persons were killed in Dublin, Clare and Kilkenny, beside a very large number of cattle and horses. In parts of England, too, storms have arisen, and have exploded at high pressure with similar effect. In Merthyr (South Wales) on Saturday there was a great rainfall, attendant upon a thunder storm, in consequence of which a water-course running by the side of a line of railway, burst, and overflowed the latter near the mouth of a tunnel. An embankment was thrown up to stop the flooding of the tunnel, but from some lack of care a train run into the embankment, and becoming thus stuck fast was submerged, and the passengers had to be drawn up the face of the tunnel wall by means of ropes—a by no means pleasant way of traveling, I should suppose.

FURTHER FIRES.

With a prolongation of the great heat, there have, of course, been several more fires in various large towns. At Bristol on Wednesday night, the hat manufactory of Mr. Skinner was burnt down, the owner and three of his children being suffocated, or burned, before they could be rescued. In the same town, a couple of days later, the greater part of the Wilder Street Iron Works were destroyed, with the valuable machinery and engines fixed therein; a Leeds foundry has also fallen a victim to the destroying element.

MORE RAILWAY ACCIDENTS.

But, however much we may have to say about the heat and fires, it is in respect of railway accidents that we chiefly feel our excellence during the past week. On the Tuesday morning, to begin with, the Midland Pullman cars' train, from Glasgow and Edinboro' to London, was wrecked near Carlisle by the line over which it was traveling becoming fouled by a broken up goods train. The guard and some of the passengers were badly injured. Then, near Sheffield a coal train mangled itself up just at a junction where all the district lines converge, and blocked the whole traffic for hours, but didn't hurt anybody. At Birmingham a pilot engine was let loose and pitched into a passenger train with such emphasis as to smash the carriages and provide numerous broken limbs. At Accrington two trains embraced in a rather shy and distant way, the passengers, doubtless, benefiting by the coolness of manner thus exhibited. At Lancaster a train of eight or nine carriages left the rails on a bridge, and, generally speaking, demolished much of itself, but discreetly avoided falling into the street below by a hair's breadth, which afforded some reason for passengerial mutual congratulations. I have not space to chronicle more of these disasters.

THE WEEK'S FAILURES

have been few, the chief of those that have come under my own notice having been: (1) McCulloch & Perrin, chemical merchants, of London, whose debts are £11,000; (2) Messrs. Alberger Brothers & Co., merchants of Old Broad street and Jamaica, who owe £65,000; (3) Mr. Frank Davis, of Birmingham, jewelers' factor, whose debts are £16,000; (4) Mr. Martin Elder, London, with £82,000, and (5) Messrs. J. & L. Fraser, Cornhill, London, £150,000.

DYNAMITE

once more, and this time under strangest of all strange circumstances! The item comes to us from Germany, the matter having occurred in Elsass, *nee* Alsace. A man in that province having, it seems, become tired of life, resolved upon death, with which definite end in view he put a dynamite cartridge in his mouth and applied a lighted match to it. In a second he was blown all to pieces, and was evenly distributed over the neighboring farms. His brain (?) is said to have been affected by the heat of the weather. The Diamond Rock Boring Co. has been fined £25 for improperly storing the 200 lbs. of dynamite which exploded in the Cymmer tunnel, Wales, some weeks ago, with fatal effect.

WITH MALICE PREPENSE

our London friend, *Iron*, thus concludes a leading article on the subject of American trade, mainly complimentary to your efforts in establishing iron and steel works:

"Those best acquainted with America are best aware of the disgust and contempt with which Americans regard "domestic goods." We hope we are guilty of no excess of depreciating language when we say that the American public look upon "domestics" as "made to sell." They are good enough for other people, but never for the speaker who is delivering his "views." He may, it is true, find it convenient at times to hold forth upon the duty of supporting home manufactures imposed upon every true patriot. But he will make this speech in a suit of broadcloth from Savile Row, and will grasp in his nervous hand a hat from Regent street. When he has "got through" he will inquire the time from Frodsham, of Liverpool, or Jurgensen, of Copenhagen; will return to his house carpeted by Brussels and Kidderminster, and will then sit down with the ladies of his family—all dressed by Worth—to sip his soup with a Birmingham spoon and cut his meat with a Sheffield knife. So long as this feeling in favor of imported goods remains fixed in the American bosom, our makers of cutlery and hardware have little to fear. American manufacturers are clever and enterprising, and they avail themselves largely of any device for saving labor, but with few exceptions they aim at quantity and cheapness. This truth cannot be too thoroughly impressed upon our own makers, whose fine goods, if kept up to their ancient quality, are likely to find buyers in the United States for many years to come." Now, gentlemen, how is *that* for high?

SCOTCH PIG IRON

is not particularly lively, and makers' quotations are a little easier, albeit the shipping transactions have been on a fair scale. Last week's shipments were 7658 tons, against 11,375 in the corresponding week of 1875. Connal's stores now hold 77,858 tons. Freights remain as before.

Messrs. James Watson & Co. quote as under:

	No. 1.	No. 3.
G. M. B., at Glasgow	56/3	£4/3
Gartsherrie, "	64/6	56/6
Coltness, "	67/	56/6
Summerlee, "	60/	55/
Langloan, "	65/	55/
Carnbroe, "	59/	55/
Calder, at Port Dundas	64/6	55/6
Glengarnock, at Ardrossan	62/6	56/6
Eglinton, "	56/6	55/6
Dalmellington, "	57/	55/
Shotts, at Leith	66/	57/
Kinneil at Bo'ness	58/	54/

Messrs. John E. Swan & Bros. and Messrs. W. Colvin & Co.'s figures are 6d. per ton under the above in one or two instances.

TRADES OF SHEFFIELD.

No particular change has taken place here during the week, and it cannot be said that there are at present any indications of a possible alteration. It is now a recognized fact that the manufacturers in all the chief local trades must be content to tide over the depression as they best can, without indulging in any hope that the much wished for revival can, by any possibility, take place for at least six months. In the meantime, many even of the oldest firms are cutting down their expenses in a most rigid manner, some of them having gone so far as to discharge clerks of many years' connection with their respective employers. Large numbers of workmen have been weeded out by a process of gradual and continuous weekly dismissals, and in some trades those retained are simply employed to execute each order as it comes in. This is, perhaps, most notable in the cast steel trade, the depression in which is now more severe than it has ever yet been.

The foundries and the steel rail mills are in much the same condition as reported last week, there being still a very fair output in each instance. There is also a steadier demand for reputable boiler plates, the Atlas Works (John Brown & Co.) having a large share of the inquiry for their well known goods of this class. The armor plate departments are very well employed, both on plates and turrets for various governments. At the Atlas establishment a plate 24 inches in thickness, and weighing considerably over 30 tons, was successfully rolled on Friday last, it being the thickest plate yet produced at these works. Pig iron is quiet, and rather easy in price at late nominal figures.

The coal trade is in a very indifferent, and to some extent peculiar, position. The market is completely glutted with many kinds of house coal, particularly the more common descriptions, and the merchants have the greatest possible difficulty in effecting sales; yet the colliery owners are steadfastly upholding their nominal prices, in order that these may be advanced as soon as cooler weather affords a pretense for that step being taken. The men are working short time in all directions, despite which heavy stocks of fuel are held at many of the pits and by some of the merchants.

The returns giving particulars of the coal traffic by railway to the metropolis during the month of July show a decreased total as compared with June, the whole of the leading lines having carried 379,154 tons. Of this aggregate, the Midland took 124,561 tons; London and Northwestern, 92,087; Great Northern, 55,504; and the Great Eastern, 40,148 tons. Some of the South Yorkshire collieries forwarded more than in the preceding month, chiefly of the thick hard or Barnsley coal. The West Yorkshire pits consigned 3000 tons less than during the month of June. Twelve of the principal Derbyshire pits sent 83,200 tons over the Midland—Clay Cross, as usual, heading the list.

There is nothing specially worthy of being recorded in connection with the local labor market, except as stated herein. The question of extending working hours to 10, in place of 9, is for the present in abeyance, owing (as I understand) to two of the largest employers not feeling able to resort to a lock-out in case the men should offer an organized resistance to the proposal.

The cutlery trades are still paralyzed, but in files a little business is being done. I inclose you a biography of Mr. George Wostenholm, cut from the Sheffield *Telegraph*. I do not need to remind any of your business men that it was the state of Mr. Wostenholm's health which led him to transfer his undertaking to a company. When he was young he was a "perfect demon" for work, and used to examine with his own eyes and hands *every* knife made by his hundreds of workmen. His journeys to America were generally unpremeditated. He would go home at a late hour at night and order his portmanteau to be ready at 8 next morning, as he was "just going to remove to New York for a day or two." He was a very wealthy man at death.

STEEL FOR WAR SHIPS.

Iron says: "Another step in advance in shipbuilding has been taken by the introduction of steel for the hulls of war ships, by which a great diminution of weight will be gained and consequent speed. The contract for the first six vessels of this new build has been given to the important firm of Elder & Co., of Glasgow. They are to be corvettes of 2300 tons, and will carry 14 guns. The steel hull will be sheathed with two thicknesses of teak and coppered externally, and the craft is intended for service on foreign stations. The machinery and boilers will be protected by a strong armored deck, and it is expected that the corvettes will be able to maintain the high speed of 20 miles an hour. Should this expectation be realized, we shall have in these strong and handy ships a most efficient convoy for our commercial marine in war time, and no less efficient instruments, were the Declaration of Paris out of the way, for sweeping the seas of the commerce of the enemy. The present order will, as far as it goes, reanimate the depressed shipbuilding industry of the Clyde; but the plates will be rolled at Sheffield, or in some other of the English steel making districts." I may add that the plates will be rolled by various companies, amongst them the Cyclops Works (Sheffield), Landore Siemens Works (South Wales), Bolton Steel and Iron Co. (Lancashire) and others of the like repute.

BIRMINGHAM AND STAFFORDSHIRE.

From the reports which have just reached me from various sources, I am half inclined to infer that there is a slight improvement in some branches of the iron trade of the districts under notice. The manufacturers of best sheets are said to have a very fair amount of business in hand, good sheets for stamping purposes realizing £13 to £15, and best, £16 to £18 per ton. There is also a renewed inquiry for hoops and angles, much of the latter description of iron being for constructive purposes. The bridge builders in several instances are doing pretty well, the Great Northern and some other railway companies being engaged in constructing works of some magnitude in Derbyshire, Nottinghamshire and Yorkshire. Pig iron and the commoner brands of merchant iron, however, are very weak, and their producers were, perhaps, never worse off for orders.

SOUTH WALES AND MONMOUTHSHIRE.

The Taff Vale Railway Company having given their employes notice to 58½ hours weekly, instead of 54, the men have organized resistance, and all came out on strike on Saturday. I suppose they will have to give way, half of their number being non-unionists. In Wales there is no such an abundance of pig iron in stock that the majority of the furnaces are likely to be stopped. There is a fair production of rails, most of which are going into stock, the Dowlais establishment being a particularly large holder in this respect. At several other works a little is being done in sheets and in tin plates, the latter being now in rather better request. One or two of the leading foundries are also producing a somewhat larger output just now. The total output of iron is, however, still infinitely below even a very low average.

THE METAL MARKETS

have been irregular during the past week, but at the moment prices have recovered somewhat, and in one or two of the leading metals fairly good sales have been effected.

The *Mining Journal* remarks: "*Copper.*—The reduced prices of Chili bars have attracted the attention of buyers, and sales have been less difficult to effect. The result is that the downward tendency which the market assumed has been arrested, and a steadiness in prices preserved. Whether this is merely a temporary movement to uphold the market, to be quickly followed by a reaction, remains to be seen, but it is sufficient for the moment to know that it has produced a beneficial change in the demand. The improvement has not altogether been confined to Chili, but orders have been given out more freely for manufactured, and £83 has been realized for 4 by ¼ sheets and sheeting. In yellow metal some business has been done in braziers and sheathing at 7¼d. Several of the sellers of yellow metal have remitted again, notwithstanding the complete failure of all previous association; but they hope that the present arrangement will be better observed and more successful. Considering the unprofitable state of business, it is really not surprising that sellers should endeavor to protect their interests in every possible way, and see whether combination will not now prove more advantageous than open competition; but without wishing to comment unfavorably upon that which, by those interested, may be deemed a great benefit, yet there is always the fear under such circumstances of foreign supplies taking the place of English. It is exceedingly doubtful in a free-trade country to continue trade combinations for any length of time with success. *Iron.*—There is no improvement whatever to record in the position of the South Wales trade. The confirmation of the protective policy about to be adopted by Russia is a blow to the ironmasters who had hoped, now their trade in other quarters having nearly ceased, Russia would still have supplied an important outlet for surplus stocks. But the protective policy very distinctly points to the exclusion of all English manufactured iron and steel. Shipments are being made to Canada and Brazil, but trade generally is as dull as possible. *Lead.*—This metal keeps up the recent advance, ordinary English pig being £21 to £21. 2/6, and special brands about 2/6 to 5/ higher. *Spelter.*—Steady, without change in value. *Quicksilver.*—One lot has been sold at £8, but the exception of that special transaction, £8. 10/, has been the price for all other business. *Tin.*—The market has been a little undecided. In the former part of the week prices gave way, and £71. 10/ was at last accepted for Australian, and £72 for Straits. The market yesterday again hardened, but to-day sellers have been rather more pressing, and show a desire to take advantage of the slight rise, but as buyers withdraw on the least signs of weakness, it has been difficult to sell more than very small lots at £72."

Von Dadelszen & North say: "*Copper.*—Chili bars touched £70, at which price a large business was reported, both on the spot and for forward delivery. The price has recovered 10/ per ton. We quote, £70. 10/ for g. o. b., spot; Wallaroo, after touching £76, is now held for £76. 10/; Burra, £75. 10/ to £76. English raw and manufactured is irregular. *Tin*, after a further decline of 10/ per ton from last week's quotations, is now steady, with sellers of Straits at £72. 10/, and buyers at £72; Australian, £72. The standard of English ores has been reduced this week £2, which is the lowest point touched for 50 years, according to the Cornish papers; English ingots, £76 to £77. *Tin Plates* are in less demand, and the tendency in buyers' favor. *Lead* continues firm at last week's quotations, viz., good soft English pig lead, £21 to £21. 5/; Spanish soft, £20. 15/ to £21. *Spelter* has also maintained last week's quotations. *Antimony* has declined to about £58 to £59. *Quicksilver*, after touching £8, is now held for £8. 10/."

Liverpool prices unchanged:

Iron: f. o. b. in Liverpool, per ton.

	£	s.	d.	£	s.	d.
Merchant bar	6	15	0 @	7	0	0
Merchant bar, in Wales	6	5	0 @	6	10	0
Staffordshire	7	5	0 @	9	15	0
Hoop	8	0	0 @	9	0	0
Sheet	9	15	0 @	10	15	0
Nail rod	7	10	0 @	9	0	0
Bar, best crown	7	5	0 @	8	10	0
Boiler plates	9	15	0 @	10	10	0

Tin Plates: f. o. b. in Liverpool, per box.

	£	s.	d.	£	s.	d.
Charcoal, I. C.	1	4	6 @	1	6	6
Coke, I. C.	1	0	0 @	1	2	0

Copper: Delivered in Liverpool, per ton.

	£	s.	d.	£	s.	0
Bolt and Sheathing	84	0	0 @	0	0	0
Tile	76	0	0 @	0	0	0
Tough cake	75	0	0 @	0	0	0
Best selected	76	0	0 @	0	0	0

Messrs. Harrington, Horan & Co. (Liverpool), in their copper report, say: "The dullness noticed in our last report was intensified until the price of Chili bars receded to £70 per ton, at which considerable sales were made. During the fortnight nearly 3000 tons bars changed hands at £73. 10/ down to £70, and the market to-day is steady at £70. 10/ to £71. 10/ per ton. A cargo of 750 tons ore at Swansea, also 250 tons here, sold at 13/9 per unit; 50 tons Corocoro Barilla at 15 6 per unit; and at the Swansea sale by tender on the 8th instant, 1446 tons ore average produce 16 5-16 per cent. realized 13/9½ per unit, Cape ore bringing 14/¾ per unit. *Tin.*—Market flat. Sellers of Straits and Australian at £72; British at £77 and Peruvian £60 to £64 as in quality. *Lead.*—Market firm at 21. 5/ for ordinary shipping brands, and £20. 15/ for Spanish without silver. *Spelter.*—Market firm at £23. 5/ for ordinary Silesian brands."

Machinists' Tools at the Centennial.

(Continued.)

WILLIAM SELLERS & CO.,

Philadelphia, Pa., have, undoubtedly, the largest exhibit of this class of machinery to be found in the building, including specimens of most of the tools built by them, and by which they have acquired their favorable and widespread reputation as a representative American house. By far the most conspicuous feature of the display is a planer having capacity for work 120x120 inches, 30 feet long. There are three independent heads to the machine; one on the cross-head, and one on each of the uprights, thus enabling three separate faces to be planed at the same time. The cross-head is raised or lowered by power from an independent counter. The various feeds are operated either automatically or by hand, as desired, and the machine, ponderous and massive as it appears, is capable of being handled by the operator as easily and conveniently as a smaller tool. There are also a 54x54 inch and a 30x30 inch planer, the former embodying the peculiar features of the heavier, and the latter of the lighter types built by the firm. All their machines of this kind have the worm-rack motion for the table, and are powerfully geared. They are driven by open and crossed belts, having independent shifters operated by Seller's patent reverse motion. The speed is doubled on the return stroke by means of a larger driving pulley on the counter. A double headed wheel lathe, of 78 inches swing is situated at the southeast corner of the space. It is intended for turning off the tires of locomotive drivers—taking a pair on their axle, and doing the work on both at the same time. Both heads and slide-rests are independent; the former being capable of running at the same or different speeds, and each supplying the automatic feed motion for its own tool-rest. There is also an attachment for requartering for the crank pins—a very convenient arrangement for railroad repair shops, in the outfit of which regular quartering machines are frequently omitted. An exceedingly accurate and convenient machine of this kind is shown, having capacity for all sizes up to the largest drivers used, and all variations of crank radius from 5 inches to 13 inches. The wheels on the axle are received upon stout centers and rigidly supported while boring or quartering by bearings which are adjusted to the treads of the wheels, thus relieving the centers from all strain. Both crank pin bearings may be bored at the same time, the boring attachments being independent, and each having its own adjustable automatic feed. If desired, they may be detached from the machine and used as portable horizontal drills, in which capacity they make a very handy and efficient tool. The shears are made long enough to accommodate broad gauge, and the span may be varied to narrow and intermediate gauges. To illustrate the accuracy of this machine, a cast iron disk is shown having a circle of holes drilled by it, which in all possible combinations come exactly central. Near the quartering machine stands an improved cylinder boring machine, designed especially for locomotive shops, but capable of boring, cutting off sinking heads, and facing the flanges of any cylinder not exceeding 22 inches diameter. As the last two operations may be performed while the rough cut is running in the bore of the cylinder, a great saving of time is effected, and from the power and rigidity of the machine, but one rough and two finishing cuts are necessary in boring, unless an unusual amount of finish is allowed in the casting. The machine has a stationary and a moveable head, the spindles of which are hollow, and carry a 6 inch steel boring bar, upon which is a cutter head, a full set of all sizes required for diameters from 10 inch to 22 inch being supplied with the machine. The feed (either automatic or hand) is adjustable from 0 up to ½ inch, and is obtained by traverse of the boring bar. The latter may be drawn back entirely, to allow of setting the work. The large gears for driving the bar (one at each end) carry independent slide rests for turning the flanges, &c. In the test made by the Judges of Awards, this machine gave remarkable results, finishing a 16x33 inch cylinder in three hours and fifty-five minutes. As the average time for performing this work is from 12 to 15 hours, any comment on the comparison is unnecessary. Two vertical boring mills are shown, one of capacity for boring and turning work up to 84 inches diameter; the other for boring and squaring off hubs of car wheels. The former has uprights and cross-head somewhat similar to those of a planing machine, and is capable of a large range of vertical adjustment. The compound head which carries the boring bar has a traverse on the cross head from the center outward, to allow of turning on the outside of work not exceeding 84 inches diameter. The revolving table of the machine runs on circular truncated V bearings, beside having an adjustable step bearing to the shaft, thus insuring perfect rigidity. The feeds are transverse, angular, and vertical, and are either automatic or hand. The machine is capable of a large range of work, and is especially useful in locomotive shops for boring out driving boxes, tires, &c., and turning and boring drivers, &c., &c. The car wheel boring machine has capacity for wheels up to 36 inches, and general work to 48 inches diameter. The head has an automatic vertical feed and a quick return, being counterbalanced by a weight inside of the housing. The revolving table has a chuck which may be used as either universal or independent. A patent swing crane is attached to the machine for handling work conveniently. The horizontal drilling and boring machine is adapted to general work. The table has vertical, longitudinal and transverse screw adjustments, and the spindle being back geared admits of ten changes of speed. The feed admits of a traverse of 24 inches, and is adjustable from 0 up to ⅛ inch pitch. Facing the cross aisle is a hydrostatic press for locomotive drivers. The cylinder is copper lined to prevent the liquid from penetrating the pores of the cast iron chamber. The ram is 9 inches diameter, and the pump plunger ¾ inch. The latter is worked by a large pulley on the crank shaft, without the interposition of gearing. The capacity of the machine is for drivers up to 72 inches diameter. There are two slotting machines, one of 36 inches and the other of 60 inches. Both have convenient adjustments and automatic feeds, the latter being all within reach of the operator from one position. Near the slotters is a 12 inch shaping machine, which—as also the former—has the Whitworth quick return motion. Batho's patent nut shaping machine mills all sides of nuts at once, making them perfectly true and uniform, and giving a sufficiently good finish for ordinary purposes. The vertical drill press will drill in center of 45 inches, and has ample vertical adjustment of table, beside allowing of the latter being swung aside to admit of work being placed upon the base-plate. The feed is automatic and adjustable, and allows of a quick return motion of spindle. The engine lathes exhibited are of 48, 20, and 16 inches swing respectively, beside a brass finishers' lathe of 20 inches swing. The peculiar features of these tools, are the flat shear bearings and the adjustable friction feed. Two bolt cutters are shown, having adjustable automatic stop motion for opening the dies, and a patent oil feeding apparatus. One of the most ingenious and efficient machines exhibited by this firm, is an automatic gear cutter, which, after being set for the required pitch, etc., performs all the functions necessary to complete the teeth of spur or bevel gears. As specimens of workmanship, all of the many machines included in the display are unexceptionable, and evince a desire on the part of the builders to produce tools of the utmost accuracy and durability, rather than showy or highly finished ones.

FERRIS & MILES,

of Philadelphia, Pa. The exhibit of this firm includes a number of machines of the class under consideration, which contain several novelties in the shape of improved appliances and attachments for accuracy and convenience of handling, which, together with the excellence of workmanship employed in their construction, have gained for them a very fair reputation. The engine lathes exhibited are two of the smaller sizes, containing patented screw cutting attachment, by means of which the lead may be instantly varied for 16 different pitches of thread, without changing any of the gears. The feed is derived from a gear on the leading screw (which is splined the whole length to receive a feather or a sliding key), which travels with the carriage, and by means of the necessary intermediate gearing operates the rack and pinion motion, thereby giving a positive feed, and reserving the use of the leading screw for chasing only. The lathes are fitted with compound rests and automatic cross-feeds. As both feeds are driven by the screw shaft, it is evident that they are capable of the same number of changes as the latter. The axle lathe shown is for turning car and locomotive axles, and is of necessity very strong and powerful, as the requirements of this class of work, next in importance to accuracy of fits, are a heavy cut and course feed, beside a maximum speed

of rotation which would soon destroy any but the most substantially built lathe. This machine was awarded a silver medal at the Franklin Institute Exhibition of 1874. The shaping machine contains some improvements in regard to convenience of handling, the object being to have control of all parts of the machine from one position. The importance of this feature will be readily recognized by all workmen. Whitworth's differential crank is used for quick return stroke of the head. The planing machine exhibited, although of small size (22 inches by 22 inches), represents in most features all the different sizes built by the firm. It is very strong in design, and of ample power. The table rack and all gears are cut and run smoothly, reversing promptly without jar or slipping of belts at the exact point for which the shifter dogs are set. The feeds are all automatic when desired, and of ample stroke. The quick return is obtained in the ordinary manner of two belt planers, by means of a large reversing pulley or counter. The upright drill press contains several improvements, and is of original design in all its details. It is of the pattern known as column drill, having a radical arm supporting the circular table, which has vertical, transverse and circular adjustments. The column is mounted on a base-plate having T slats for clamp-bolt heads, and a lower bearing for boring bar. When it is desired to use this, the table is swung around to the rear of the column, leaving an unobstructed space under the spindle. The spindle is counterbalanced by a weighted lever, connected directly at the top, and is held firmly up against the lower bearing, which prevents the drop usually caused by lost motion when the point of the drill goes through, thereby saving many breakages from this cause. An excellent feature of this machine is a sliding head gibbed to the upright, and carrying the lower bearing of the spindle. This affords much greater rigidity than the usual method of feeding the spindle through the bearing, and leaving it unsupported. The feed is automatic when necessary, and has three belt changes. The spindle has a quick return motion by means of a rack and pinion in the sliding head, operated by a friction crank on the worm-feed wheel. The radial drill has the column mounted on a base plate, having on one end a circular revolving table, with a verticle adjustment by means of a central screw, while the opposite end is planed and slotted for bolt heads, to allow of clamping large work. The adjustments of the drill are made by the radiation of the arm, or by moving the head in or out on the latter by means of a rack and pinion. The machine is back-geared, and having four belt changes, allows of 8 changes of speed on the spindle and insures ample power for the heaviest work. The feed is automatic, and from the convenient arrangement of the hand wheels, &c., the operator can stand equally well on either side of the drill. The large slotting machine is of good design, and appears to possess the primary requisites of rigidity and great power. The head guides are adjustable vertically to allow of being as near to the work as possible. The connecting rod is made unusually long, to obviate, as much as possible, the side pull against the guides. The counterbalance lever is connected by a link directly to the upper bearing pin of the connecting rod. Whitworth's quick return motion is used, in connection with an unusually large gear, which carries the ordinary cam for the feed motion. By means of a brake applied to the inner face of the cone pulley, the machine may be instantly stopped at any point of the stroke. A machine for cutting off, squaring the ends, and drilling and reaming centers, of car and locomotive axles, occupies a position at the back of the space, where it is very apt to be overlooked unless attention is specially directed to it. For use in car or locomotive shops employed on new work, the machine would appear to be a very valuable improvement, as it is capable of effecting a great saving of time over the ordinary method of doing the work for which it is designed. The axle is held at each end by a revolving head having a self-centering chuck, and the ends squared and centers drilled and countersunk without stopping the machine.

Patent Reform.

We have received the following, of interest to our readers:

OFFICE U. S. PATENT ASSOCIATION, WASHINGTON, D. C., August 1st, 1876.

To the Editor of The Iron Age.—SIR: The value of a good patent system in the development of a nation's wealth has been strikingly illustrated in the history of our Republic, especially during the last 50 years.

The patents issued in this country number about a quarter of a million, while the growth and development of the useful arts is to-day more rapid, vigorous and healthful than ever before.

Capital invested in, and working under patents, foots up its totals by hundreds of millions.

Intelligent heads and skillful hands are found as widespread as are the ballot boxes of a free people, engaged in sowing the seeds of future, and gathering the harvests of past inventions.

Wherever a wheel turns, a hammer falls, a piston moves, or a fire burns throughout our broad domains, there the genius of American invention has made its mark.

To aid in preserving so useful an agency of national prosperity, and still further, to assist in perfecting it, are the chief objects of our Association. In this we ask the co-operation of patentees and inventors who can in no other way obtain an adequate remuneration for time, labor and genius expended; of manufacturers to whom, without protection, capital will not repay its investment; of mechanics, laborers and operatives, to whom labor saving machinery has been an ameliorating agency of untold power. Of patent attorneys and solicitors, whose knowledge and experience will render them "wise in counsel." And finally, of all who believe the progress of the useful arts to be a valuable and efficient aid to the prosperity of our people.

The comparatively small number now connected with the Association, leads us to make this appeal. We have no private interests to serve. We have endeavored in good faith to promote the general good of the cause. Such is still our object; but we do not propose to work in this matter for those who will not work for themselves. Violent and vigorous attacks are being made on our patent system. Abuses have grown up under it, which are making enemies and alienating friends; and the enemies of a cause will correct its abuses, if its friends do not. If this matter is of sufficient interest to you, we will be glad to receive your aid and co-operation in connection with a meeting of the Association, to be held at the hall of the Franklin Institute, on Thursday, Sept. 7th, at 11 o'clock A. M. If, on the other hand, it is so immaterial with you whether our patent system is made better or becomes worse, that you will do nothing to aid the one or prevent the other, all stimulus to further organized effort will be gone. We ask you to assist us, and we desire to assist you in promoting jointly your and our prosperity, and the prosperity of the nation through this, one of the most efficient aids thereto which our civilization has produced. By order of the Association.

JOHN S. PERRY, President.
CHARLES F. STANSBURY, Secretary.

In the article upon the semi-portable engine of the Erie Iron Works in our issue of August 31, the sizes of the tubes used in the boilers should have been stated as 2 inch. In the 6 horse engine, the number of tubes is 36, instead of 17, and their length, 36 inches, instead of 58. We spoke of the New York store as an agency, it is, however, the branch house of the concern.

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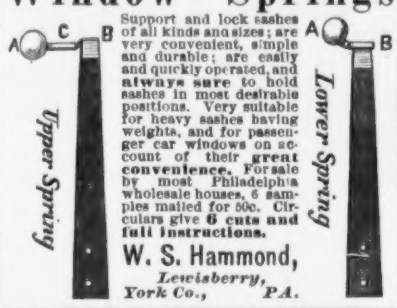
276 Pearl Street, N. Y.

HAMMOND'S
Window Springs



Support and lock sashes of all kinds and sizes; are very convenient, simple and durable; are easily and quickly operated, and always sure to hold sashes in most desirable positions. Very suitable for heavy sashes having weights, and for passenger car windows on account of their great convenience. For sale by most Philadelphia wholesale houses, 6 samples mailed for 50c. Circulars give 6 cuts and full instructions.
W. S. Hammond,
Lewisberry, York Co., PA.

HOLSKE MACHINE CO.,
279 Cherry St., near Jefferson St.
ELEVATORS
For Hotels & Stores a specialty.
Machinery in General made to order.

THE CHICAGO SCREW CO. ESTABLISHED 1872.
SEND FOR PRICE LIST.
FINE MACHINE, CAP AND SET
SCREWS
22 & 24 SOUTH JEFFERSON ST. CHICAGO.

PAT. MAR. 31. 1874
MALLEABLE IRON AXE WEDGE
NEATLY PUT UP. 1 DOZ WEDGES AND GOOD COMIC CIRCULAR IN EACH BOX
MANUFACTURED ONLY BY
AMERICAN SLEIGH AND CARRIAGE IRON CO
BOSTON MASS.

CARRIAGE SPRINGS.
JOHN H. REOCK, PASSAIC SPRING WORKS,
Manufacturer of Railroad Car, Locomotive, Omnibus, Platform and every variety of Carriage and Buggy Springs. 212 to 240 Passaic St., Newark, N. J.
Lock Box 165

The Iron Age,
PUBLISHED
EVERY THURSDAY MORNING
BY
DAVID WILLIAMS
No. 10 Warren St., N. Y.

WESTERN OFFICE:
14 Fifth Ave., Pittsburgh.
JOS. D. WEEKS,
Manager and Associate Editor.

PHILADELPHIA OFFICE:
220 South 4th St.,
THOS. HOBSON, Manager.

A Commercial, Industrial AND Scientific Review OF THE IRON, HARDWARE & METAL TRADES.

The circulation of *The Iron Age* is more than double that of any other journal of its class in the country.

It is the oldest newspaper in the world devoted to the Iron, Hardware, or Metal Trades, having been established in 1855, under the name of the *Hardwareman's Newspaper*, which name was changed in 1859 to *The Iron Age*. The next oldest journal of its class is *The Ironmonger*, of London, established 1859.

As an advertising medium, to reach the Iron, Hardware, and Metal Trades in all their branches, *The Iron Age* is the best in the country. Although its circulation is so large, we have not fallen into the common error of making advertising rates too high. Our prices are as low as is consistent with profit; we adhere to them without deviation, and our customers find their advertisements profitable.

Rates of Subscription & Postage.

Weekly Edition - - $4·50 a year.
Issued every THURSDAY morning. Contains full Trade reports for the week, brought up to the close of business on the previous day.

Semi-Monthly Edition - $2·30 a year.
Issued the FIRST and THIRD THURSDAY of every month. Contains a full Review of the Trade for the previous half month.

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Issued the FIRST THURSDAY of every month. Contains a full Review of the Trade for the previous month.

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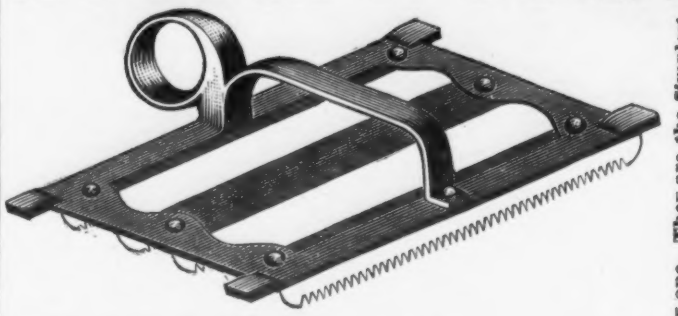
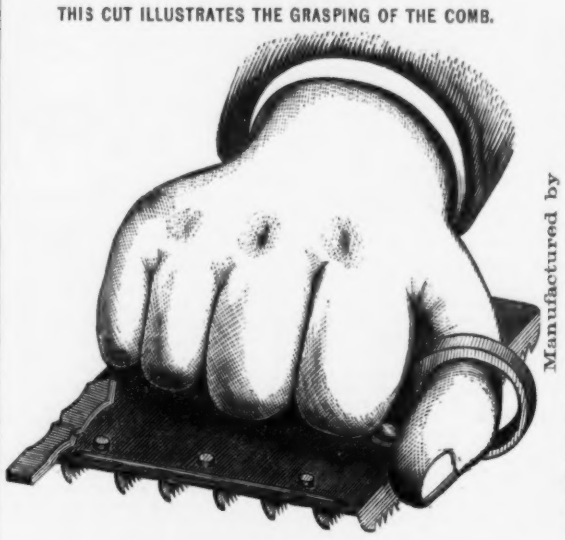
One square (12 lines, one inch) one insertion, $2·50; one month, $7·50; three months, $15·00; six months, $25·00; one year, $40·00; payable in advance.

HOTCHKISS' PATENT NOVELTY COMBS.



THIS CUT ILLUSTRATES THE GRASPING OF THE COMB.

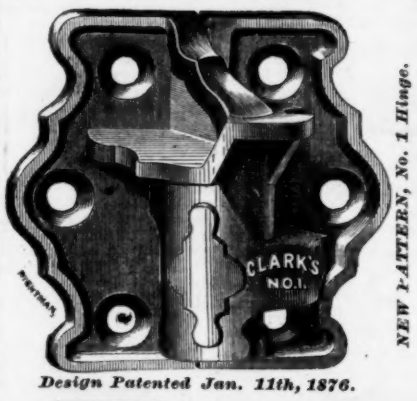


Manufactured by
HOTCHKISS' SONS,
Bridgeport, Conn.

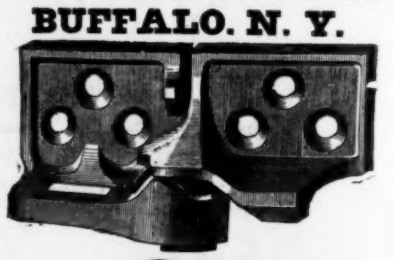
These Combs do not infringe upon the rights of any one. They are the Simplest, Neatest and Most Durable CURRY COMBS ever offered to the trade, affording an easy grasp for the hand, without the use of the ordinary side handle, and are universally acknowledged to be superior to all others. They are neatly put up in paper boxes of one dozen each, and packed 24 dozen in a case. Special net prices furnished on application.

Sample and Warerooms with GRAHAM & HAINES, 113 Chambers Street, N. Y.

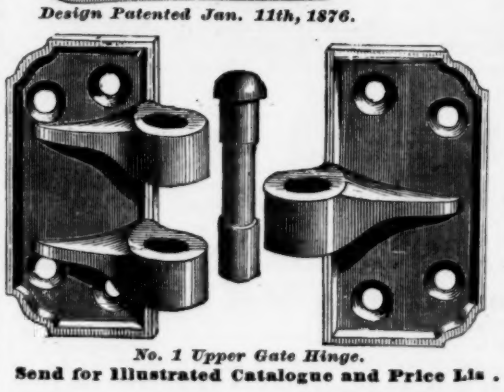
CLARK & CO.,
MANUFACTURERS OF
BUILDERS' HARDWARE.
BUFFALO, N. Y.



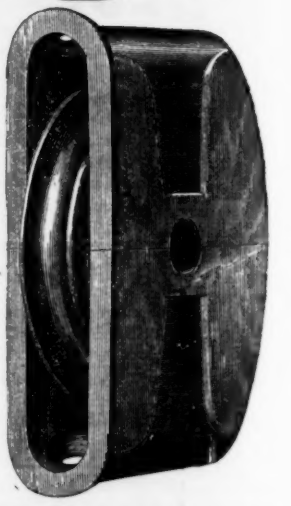
NEW PATTERN, No. 1 Hinge.



Design Patented Jan. 11th, 1876.



No. 1 Upper Gate Hinge.



Send for Illustrated Catalogue and Price List.

TEN EYCK AXE MFG. CO.,
COHOES, N. Y.
Warehouse, 103 Chambers Street, NEW YORK.
Manufacturers of AXES of all Kinds.
Hatchets, Adzes, Grub Hoes, Mattocks & Picks.
Sole Manufacturers of the "WASHOE" PICK.
Catalogues and Price Lists furnished upon application.

CHAMPION HOG RINGER
Rings and Holder
Only Double Ring ever invented.
The only ring that will keep HOGS from rooting. No sharp points in the nose.
Ringers 75c. Rings 50c 100.

EAGLE BILL CORN HUSKER
Is the best Husker in the market. Farmers say it is the best. Use no other.
Holders 75c. Huskers 25c.

BROWN'S HOG AND PIG
Ringer and Rings.
Only Single Ring that closes on the outside of the nose. No sharp points in the nose to keep it sore.
CHAMBERS & QUINLAN,
Exclusive Manufacturers, Decatur, Ill.

RHODE ISLAND HORSE SHOE CO.,
OFFICE, 81 Canal Street, Providence, R. I. WORKS at Valley Falls, R. I.
Manufacturers of
PERKINS and RHODE ISLAND PATTERNS of
HORSE AND MULE SHOES.

L. COES'

Genuine Improved Patent

SCREW WRENCHES.

Manufactured by

L. COES & CO.,

Worcester, Mass.

Established in 1830.

Registered March 31, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jeg bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the *fact*, that in 1869 we made several *important* improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were *at once closely* imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon *our* improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be *good* evidence that we manufacture a superior Wrench, we wish the trade *may not be deceived* on the question of *originality*. Trusting the trade will fully appreciate our *recent* efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

"L. COES & CO."

Warehouse, 97 Chambers St., & 81 Reade Sts., N. Y.

HORACE DURRIE & CO., Sole Agents.

JOHN S. HUNTER, President. EDWARD J. MURPHY, Sec. & Treas.

The Hartford Foundry & Machine Co.,

Successors to the WOODRUFF & BEACH IRON WORKS,

MANUFACTURERS OF

Marine & Stationary Engines, Mill Gearing, Hoisting and Mining Machinery.

PUMPING ENGINES, for City and Town Supply a Specialty.

60 to 96 Commerce Street, HARTFORD, CONN.

STAFFORD MANUFACTURING CO.'S

Stencil Combinations.

Containing: Stencil Alphabet, Figures, Can Stencil Ink and Brush.

For marking boxes, barrels, bags, and packages for shipment. Printing all manner of showcards, notices, signs, numbers, prices, &c., and other purposes too numerous to mention. Instructive and amusing for boys.

WHOLESALE PRICES.

Size.		Size.	
½ in., per dozen	$6·00	1¼ in., per dozen	$10·00
¾ " "	6·50	2 " "	12·00
1 " "	7·00	2½ " "	18·00
1¼ " "	9·00	1½ " with lower case	15·00

An Illustration of sizes sent on application.

For sale by Hardware Dealers and Stationers.

No. 66 Fulton Street, New York.

BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of **Shank, Socket Firmer, and Socket Framing Chisels,**

PLANE IRONS.

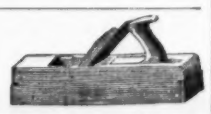
Gouges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

GREENFIELD TOOL CO.,

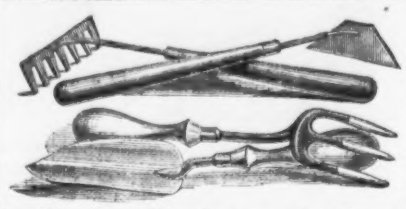
Greenfield, Mass.

Sole Manufacturers of the Celebrated

"Diamond" PLANE IRONS,

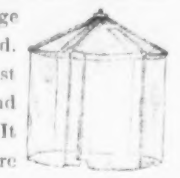


EXTRA PLATED TABLE CUTLERY. PATENT FORGED OX SHOES. The **only** Shoe made with **concavity** to fit hoof. **BENCH AND MOULDING PLANES** of every description, &c., &c. **Drop Forgings to order.** Address for Catalogue with stamp.



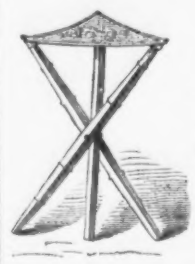
This set of **GARDEN TOOLS,** is put up in a nice paper box, and is superior to any other in the market. The tools are made of the best quality of Steel, highly polished, and of malleable iron polished or painted, with birch handles. We will make it an object for every dealer to handle them.

PRICE $15, PER DOZEN SETS.



This **MOSQUITO BAR** is large enough to cover a full size bed. It has a nice Folding Frame, best quality of netting, with cord and ring complete for hanging. It is as good as those which are usually sold for $5·00.

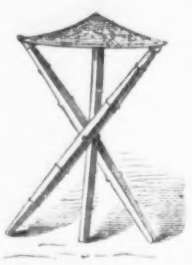
PRICE, $24 PER DOZEN.



CENTENNIAL CHAIR.

This Chair is made of the best second growth White Ash, finished on the wood, with Brussels Carpet Seat. It shuts up to the size of a single chair post, and weighs only one pound. Every person who forgets to take one with him when he goes to the Centennial, will be sorry when he gets there, as no chairs are provided for visitors, and they get very tired. Every store in the land can sell a few of them at a profit. They are a very popular article here.

PRICE, $12 PER DOZEN.



MILLERS FALLS CO., 74 Chambers St., N. Y.

Corner BROADWAY.

THE EAGLE ANVIL !! WARRANTED !!

(ESTABLISHED) 1843.

These Anvils are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The best English Anvils become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils is of crystallized iron, and no settling can ever occur; the steel face, therefore, remains perfectly true. Also, it has the great advantage that being of a more *solid* material, and consequently with less rebound, the piece forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as of a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *hammer one-fifth lighter* than that required when using a wrought iron anvil.

The working surface is in *one piece* of JESSUP'S BEST TOOL CAST STEEL, which, being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel*. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off.*

☞ **NEW PRICE LIST.** ANVILS of 100 lbs. to 800 lbs., 10c. per lb.

Small Anvils, ("Minims.")

	No. 00	0	1	2	3	4	5	6	7	8	9
Weighing about		10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
	$2·50	$3·20	$3·75	$4·50	$5·00	$5·90	$6·75	$7·25	$8·10	$9·00	$9·50

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade)

New York.—Messrs. J. CLARK WILSON & CO.—RUSSELL & ERWIN MFG. CO.—Messrs. HORACE DURRIE & CO. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE. Louisville.—Messrs. W. B. BELKNAP & CO.

FISHER & NORRIS, Sole Manufacturers, Trenton, N. J.

HOWARD PARALLEL BENCH VISE.

MANUFACTURED BY

Howard Iron Works,

Send for price list. Buffalo, N.Y.

RUSSELL & ERWIN MFG. CO. NEW YORK & PHILADELPHIA AGENTS.

SOMETHING NEW!

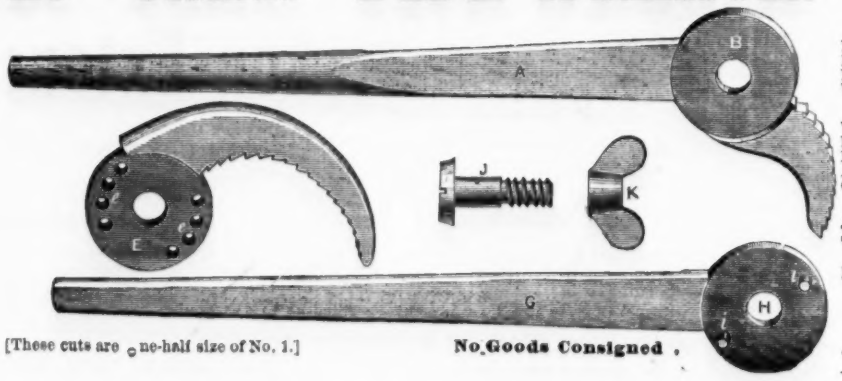
SAMSON WRENCH.

It is the only Wrench that will hold *Gas or Steam Pipe, Gas Burners, Round Iron or Steel* without slipping. Samples sent to the trade only, on receipt of fifty cents and business card.

W. J. FLANAGIN & CO., Sole Manufacturers,

Office, 32 North 5th Street, PHILADELPHIA.

The "Climax" PIPE WRENCH.



[These cuts are one-half size of No. 1.]

No Goods Consigned.

NEW & NOVEL,

And of

RARE Practical Merit.

Made of BEST TOOL STEEL,

FORGED SOLID FROM THE BAR.

Is having a Large Sale. Sells readily to

Steam and Gas Fitters and Plumbers.

Also to *MACHINISTS AS A UNIVERSAL WRENCH.*

Send for Descriptive Circular and Price List. Very liberal terms to the trade.

—o—

Sold in New York City by

McNab & Harlin Mfg. Co.....56 John St.
Morris, Tasker & Co.....15 Gold St.
Nason Mfg Co.....61 Beekman St.
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Walworth Mfg. Co.....69 Kilby St.
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May & Co.....20 Oliver St.
A. J. Wilkinson & Co., 48 Washington St.
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London, England.

Jno. G. Rollins & Co. Old Swan Wharf.
C. Churchill & Co., 28 Wilson St., Finsbury.

Bremen.....Aug. Eggers.

THE HULL & BELDEN CO.,

Manufacturers,

Danbury, Conn.

4000 Remington Revolvers at Job Lot Prices.

JOHN P. MOORE'S SONS,

Wholesale Gun Dealers,

300 BROADWAY, N. Y. ESTABLISHED 1823.

Everything in the Line. Bottom Prices Guaranteed.

ELEY'S GOODS.

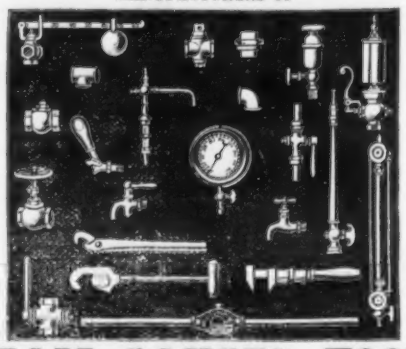
Agents for COLT'S REVOLVERS, &c., &c.

EATON, COLE & BURNHAM CO.,

58 John Street, New York.

MANUFACTURERS OF

Wrought Iron **PIPE,** Cast Iron FLANGED PIPE, Cast Iron RADIATORS and BOILERS.

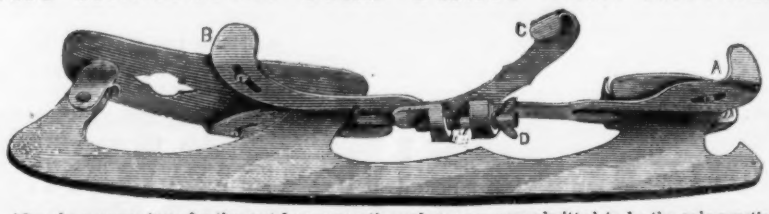


Brass & Iron **STEAM** Gas & Water FITTINGS. PLUMBERS' MATERIALS.

STEAM GAUGES, TOOLS,

And all Supplies used by Machinists, &c.

The American Club Skate Still Ahead.



After the severest tests for the past four years, these skates are now admitted to be the only practical **SELF-ADJUSTING SKATES IN MARKET.** The clamps are first adjusted to the shoe by turning the thumb-screw D when the lever C is in the above position; when once adjusted, place the skate on the foot, close the lever C, and the skate is securely fastened to the foot. By the action of the clamps, the skate is always in the center of the foot, and cannot slide from side to side as in other clamp skates. They require no heel plates, key or wrench.

PRICE LIST.	Per Pair.
No. 1—With Blued Footplate, and Runners the same as the best	$5 00
No. 2—Same as No. 1, only nicely Nickel Plated effectually prevents the skate from rusting	6 00
No. 3.—Same as No. 2, only before the skate is put together each part is finely Polished and heavily Nickel Plated, the finest skate ever offered	8 00

Sole Jobbing Agents for **WINSLOW'S WOOD TOP SKATES.**

Special trade catalogue sent on application. Address,

PECK & SNYDER, Manufacturers, 126 Nassau St., N. Y.

John T. Lewis & Bros.,

No. 231 South Front St., PHILADELPHIA.

JOHN T. LEWIS & BROS. WARRANTED PURE WHITE LEAD PHILADA.

TRADE MARK.

MANUFACTURERS OF

PURE WHITE LEAD, RED LEAD, Litharge, Orange Mineral, Linseed Oil AND PAINTERS' COLORS.

ATLANTIC WHITE LEAD CO. ROBERT COLGATE & WARRANTED PURE

TRADE MARK

The Atlantic White Lead and Linseed Oil Company,

MANUFACTURERS OF

White Lead (Atlantic), Red Lead, Litharge & Linseed Oil.

ROBERT COLGATE & CO.,

287 Pearl Street, New York.

Established A. D., 1777.

WETHERILL & BRO.,

Manufacturers of

White Lead, Red Lead, Litharge & Orange Mineral.

Offices, 31st. St. below Chestnut, PHILADELPHIA.

Brooklyn White Lead Co.

BROOKLYN WHITE LEAD CO., INCORPORATED 1853
SUPERIOR PURITY, DURABILITY AND COLOR
ADDITIONAL TRADE MARK
We caution consumers against the numerous brands, in imitation of ours, of adulterated and greatly inferior qualities which are sold as pure LEAD.
$50 Reward for detection of counterfeits.
F. HOWE, Tr.
Office, No. 89 Malden Lane, NEW YORK.
BROOKLYN WHITE LEAD COMPANY PREMIUM LEAD WARRANTED PURE

TRADE MARK.

White Lead, Red Lead and Litharge.

89 Malden Lane, NEW YORK, FISHER HOWE, Treas.

JOHN JEWETT & SONS,

Manufacturers of the well known Brand of

WHITE LEAD.

JEWETT & SONS' PERFECTLY PURE WHITE LEAD.

TRADE MARK.

Also Manufacturers of

LINSEED OIL

182 Front Street NEW YORK

Pipe, Fittings, &c.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS

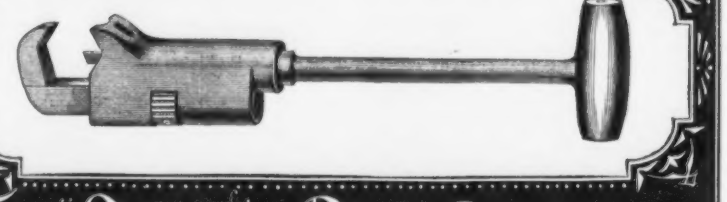
For STEAM, WATER and GAS.

Wrought Iron Pipe & Fittings, Plain and Galvanized

PLUMBERS' MATERIALS.

Illustrated Catalogue sent by express to the Trade on application.

Factory, Paterson, N. J. 56 John Street N. Y.



The Acme Pipe Cutter.

MADE ENTIRELY OF SOLID CAST STEEL.

Cuts Wrought Iron, Brass and Copper Pipes, Round Iron &c perfectly true without leaving burr on pipe, contracting or splitting it. Cuts out a chip similar to a lathe tool. The knife may be removed and ground. Send for descriptive circular to manufacturers.

Pancoast and Maule PHILADELPHIA PA.

THE SELDEN DIRECT-ACTING STEAM-PUMP
PAT. AUG. 2, 1870. DECEMBER 20, 1870
AND OCT. 21, 1873
COMBINING SIMPLICITY AND DURABILITY TO A REMARKABLE DEGREE. ITS PARTS ARE EASY OF ACCESS AND IT IS ADAPTED TO ALL PURPOSES FOR WHICH STEAM PUMPS ARE USED.
G. A. CARR
MANUFACTURER AND PROPRIETOR, 43 CORTLANDT ST. NEW YORK.

Pyrolusite Manganese Co.,

MINERS, DEALERS AND EXPORTERS OF HIGH TEST

Crystallized Black and Gray Oxides of

MANGANESE.

Ground, granulated and especially prepared to suit all branches of the home trade.

Warranted to contain from 70 to 90 per cent. peroxide of manganese, and to give satisfaction with regard to price and quality.

ALSO, MANUFACTURERS OF SUPERFINE FLOATED

Standard Barytes.

Office, 214 Pearl Street, New York.

Ludlow Valve Mfg. Co.,

OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.,

VALVES

(Double and Single Gate, ½ in. to 48 in.—outside and inside Screws, Indicator, &c.) for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

GOLD MEDAL

Non-Extensible Razor Belt.

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873, and JUNE 9, 1874.

In this Strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

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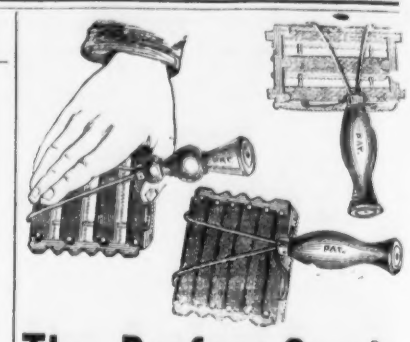

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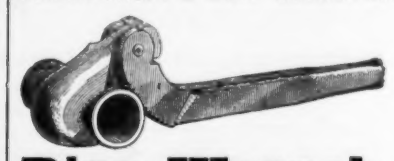

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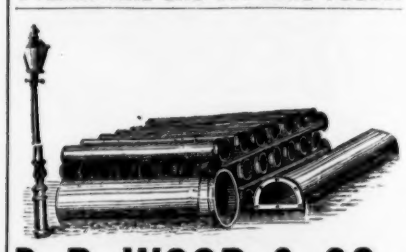

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N. Y. Handle & Mallet Works, 456 E. Houston. 33

Manganese.
Pyrolusite Manganese Co., 214 Pearl, N. Y. 26

Metal Dealers and Brokers.
Coddington E. B. & Co., 25 and 27 Cliff, N. Y. 2
Crane U. O., 104 John, N. Y. 4
Fuller, Dana & Fitz, Boston, Mass. 2
Graves O. W., 42 Cliff, N. Y. 2
Gregg H. L. Co., 108 Walnut, Phila. 3
W. J. Hammond, Pittsburgh, Pa. 2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Purves A. & Son, cor. South and Penn, Phila. 30
Quincy J. W., 98 William, N. Y. 2
Sturges Frank & Co., 72, 74 & 76 Lake Chicago. 3

Metallurgists.
Britton J. Blodgett 339 Walnut Phila. 6
Wallace & Humphrey, 113 Walnut, Phila. 6

Metals, Anti-Friction.
Baldwin B. W., Pittsburgh, Pa. 40
Bion's Smelting Works, Williamsburg, N. Y. 2

Metals Perforated.
Hayes G., 71 8th ave. 2

Metal Roofing.
Hickcox Mfg. Co., 280 Pearl N. Y. 4

Meat Chopping Machinery.
Bailey Wringing Machine Co., 106 Chambers, N. Y. ..25
Murray Iron Works, Burlington, Iowa. 33

Miners' Candles. *Makers of*
James Boyd's Sons, 10 and 12 Franklin, N. Y. 12

Mining Spikes
Roseberry Geo. D., Pottsville, Pa. 4

Molders' Tools.
Carter H. 290 Pearl, N. Y. 34

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Dietz R. E., 54 and 56 Fulton, N. Y. 40

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Schoenberger & Co., Pittsburgh, Pa. 4

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Maltby, Curtiss & Co., 34 Reade, N. Y. 36

Nickel Platers.
Colt A. T., 47 Beekman, N. Y. 27
Continental Nickel Plating Works, 47 Ann, N. Y. ..27
Hartman John, 37½ N. Seventh, Philadelphia. 2
Manhattan Nickel Works, 180 and 182 Center, N. Y. 27
New York Nickel Plating Co, 133 West 25th, N. Y. ..27
Owen S. S. & Co., 121 E. 13, N. Y. 27
Roehrig, Fred Wm., 217 Center, N. Y. 27
Wicks & Co., 79 First st., Brooklyn, E. D., N. Y. ..27
Wilder & Co., 114 Fulton, N. Y. 27

Norway Shapes, *Rollers of.*
Rowland Wm. & Harvey, Frankford, Phila. 40

Note Broker.
Gallaudet F. W. 3 and 5 Wall, N. Y. 4

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Fuller, Lord & Co., 139 Greenwich, N. Y. 4
Haskell W. H. & Co., Pawtucket, R. I. 13
Lewis, Oliver & Phillips, Pittsburgh, Pa. 13
Roseberry Geo. D., Pottsville, Pa. 4
Russell, Birdsall & Ward, Port Chester, N. Y. 40
Shelton Co., Birmingham, Conn. 34
Sternbergen J. H., Reading, Pa. 13
Union Nut Co., 78 Beekman N. Y. 13

Oil Cook Stoves.
Riessner A., 160 William, N. Y. 36

Oil Lubricating, *Makers of*
American Natural Oil Co., 26 Cedar, N. Y. 38

Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia. 5

Ore Crushers.
Blake Crusher Co., New Haven Ct. 38

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Howson & Son, Phila. and Washington, D. C. 28
Munn & Co., *Scientific American,* 37 Park Row N. Y. 32
Spencer A. H., 28 State Boston, Mass. 28

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Eaton, Cole & Burnham Co., 58 John, N. Y. 26
McNab & Harlin Mfg. Co., 56 John, N. Y. 36
Pancoast & Maule, 227 Pear. Phila. 26

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Leighton Bridge and Iron Works, Rochester, N. Y. 10
McNeal John & Sons, Burlington, N. J. 6
Warren Foundry & Mach. Co., Phillipsburg, N. J. 26
Wood R. D. & Co., 400 Chesnut, Phila. 26

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Buck Bros., Millbury, Mass. 25
D. R. Barton Tool Co., Rochester, N. Y. 9
Middletown Tool Co., 18 & 20 Cliff, N. Y. 6

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Bailey Wringing Machine Co., 106 Chambers, N. Y. 25
D. R. Barton Tool Co., Rochester, N. Y. 9
Greenfield Tool Co., Greenfield Mass. 25
Stanley Rule & Leve Co., 35 Chambers, N. Y. 34

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Derby Silver Co., Derby, Ct. 40
Rogers & Bros., 208 Broadway, N. Y. 11

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Scott, Bend Iron Works, South Bend Ind. 37

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Everhart Jas. M., Scranton, Pa. 40
Carr Wm. S. & Co., 106 Centre, N. Y. 26

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Forsaith S. C. & Co., Manchester, N. H. 38

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Merriman A. H., West Meriden, Ct. 38
The Stiles & Parker Press Co., Middletown, Ct. 39
Peck Milo, New Haven, Conn. 38

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Wild R. W., 20 Cortlandt, N. Y. 32

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Kelsey & Co., Meriden, Conn. 40

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Mason Volney W. & Co., Providence, R. I. 39
Penfield Block Works, Lockport, N. Y. 13

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Douglas W. & B., Middletown Conn. 2
Ramsey & Co., Seneca Falls, N. Y. 4
Union Mfg. Co., 98 Chambers, N. Y. 4

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Brown Edward, 311 Walnut, Phila.

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Metcalf, Paul & Co., Pittsburgh, Pa. 37

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Jackson & Tyler Baltimore, Md. 38
Rogers H. A., 19 John, N. Y. 12

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Cambria Iron Co., Johnstown, Pa. 5
Cleveland Rolling Mill Co., Cleveland, O. 6
Griswold John A. & Co., Troy, N. Y. 33
Lackawanna Iron and Coal Co., Scranton, Pa. 5
Milwaukee Iron Co., Milwaukee, Wis. 6
The Edgar Thomson Steel Co., 57 Broadway, N. Y. ..38

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B. F. Badger & Son Charlestown, Mass. 26

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Tryon Edward K. Jr. & Co., Phila. 37

Rivets.
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Timme's Son Peter, 281 North 6th, Brooklyn, E. D. .. 4

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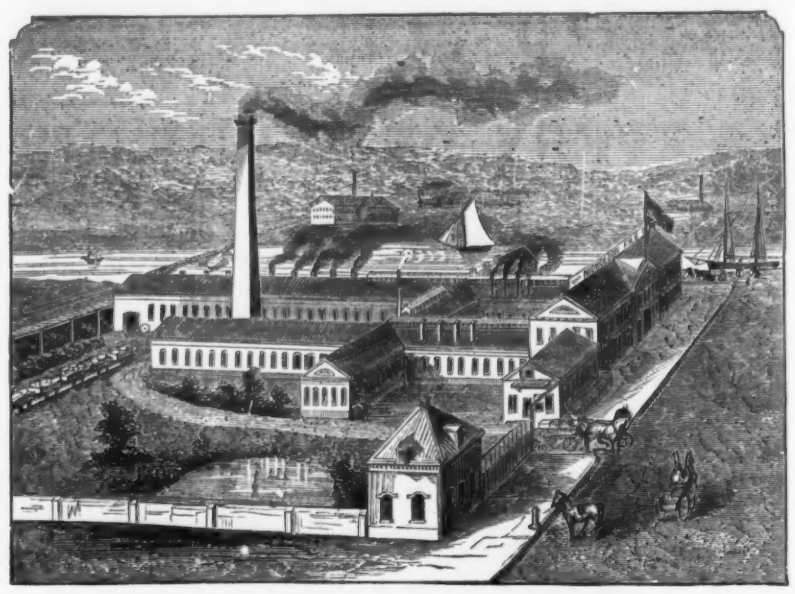

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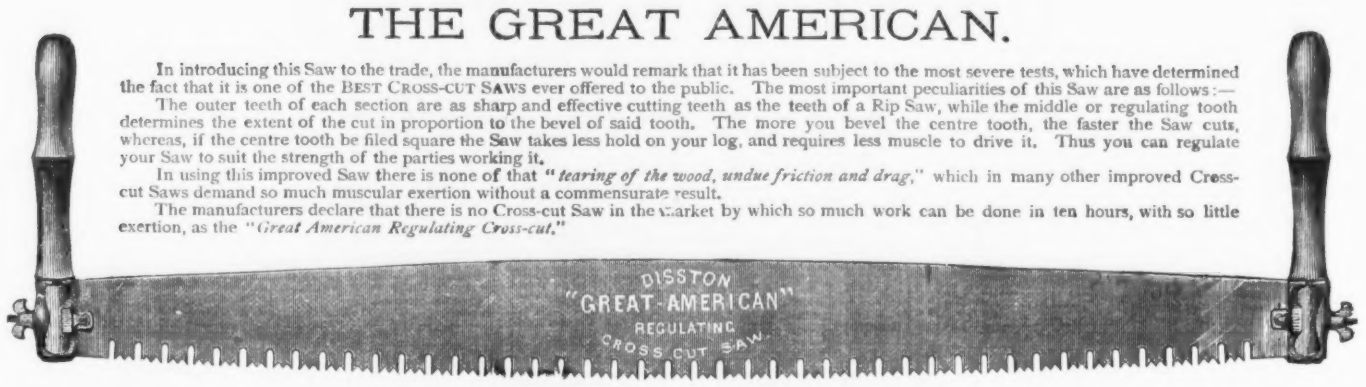
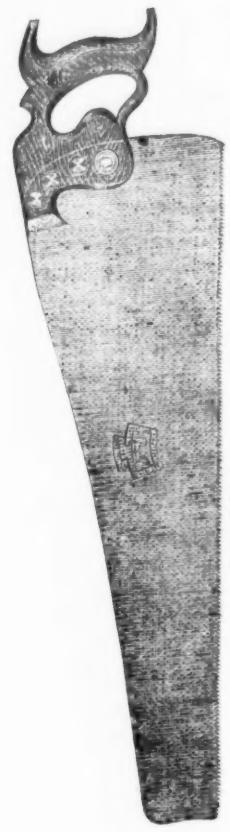
The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag*," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"



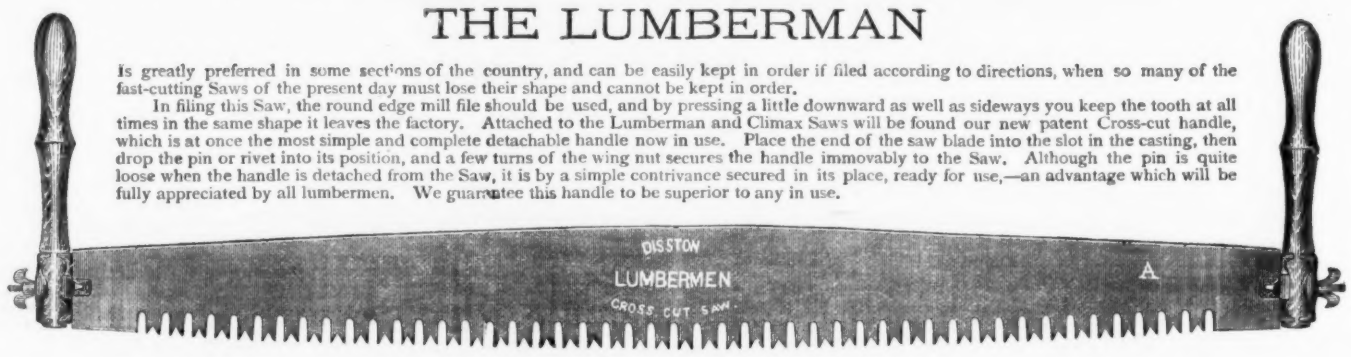


CENTENNIAL No. 76.

THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

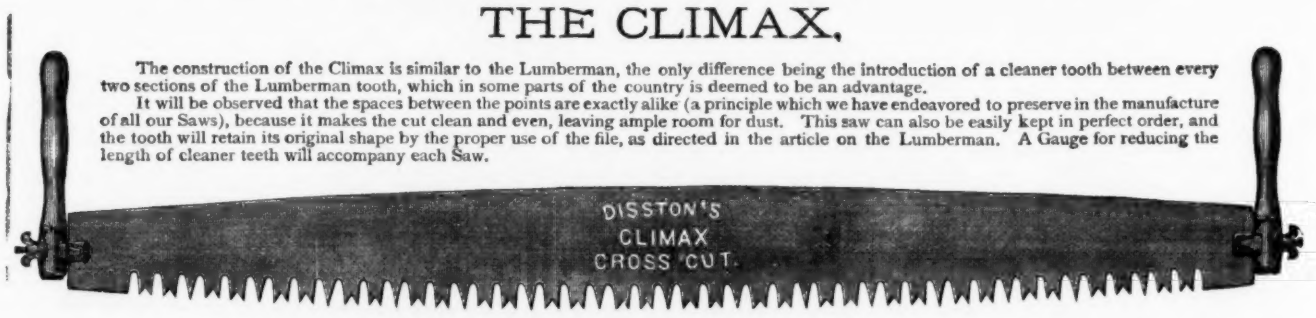
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

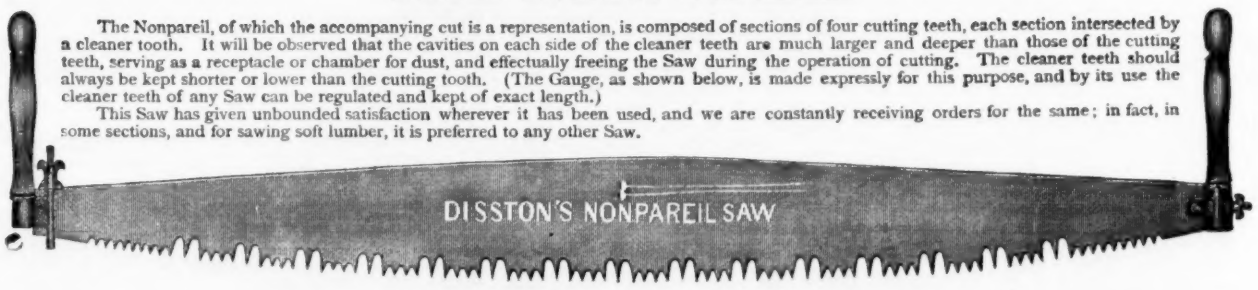
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

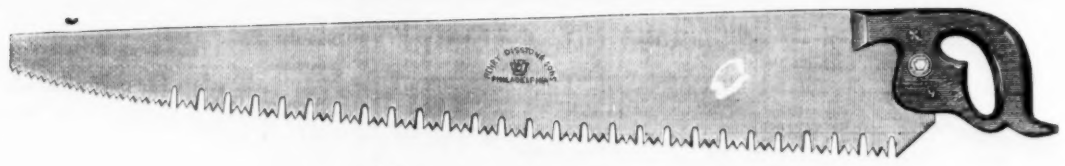
The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

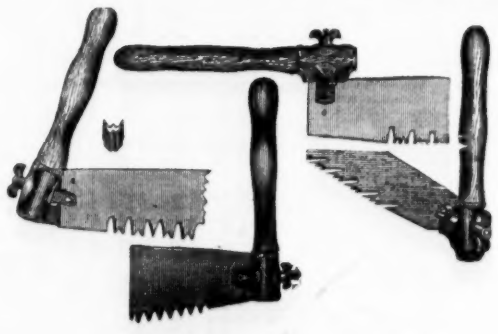
This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.

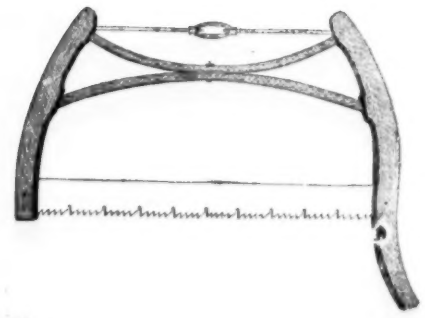


No. 1, California Flat Steel Back, Clock Spring Blade.

ACME No. 120.







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Ives
Beecher(French,Swift&Co).
Griswold } 1st quality dis 40&10 %
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Cook's (new list)
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Snell Mfg. Co dis 25 %
Jennings' Bits dis 10 %
Lewis' Single Twist Bits dis 25 @ 30 %
Andrews' Bits dis 40&10 %
Griswold's Patent Bits dis 33⅓
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" " Blake's $30 dis 40 %
" " Parmelee's, small, $30; large, $36 dis 25 %
Hollow Augers, Douglass' } dis 33⅓ %
" " Ives'
" " French, Swift & Co.
" " Bonney's Adjust. ₩ doz $48 dis 25&10 %
" " Stearns' " " ₩ doz $48 dis 25&10 %
" " Ives' Expansive each $4 50 dis 40 %
" " Universal Expansive each $4 50 dis 10 %
Gimlet Bits—Screw, $7 50; no screw, $9 dis 20&10 %
" " Diamond per doz $1 00, dis 10 %
Double Cut Gimlet Bits, Shepardson's dis 40 %
" " Ct. Valley Mfg. Co. dis 30&10 %
" " Hartwell's dis 50 %
" " Douglass' dis 25&10 %
" " Ives' dis 30 %
Morse's Bit Stock Drills, List of Jan'y 1, '76 dis 25 %
L'Hommedieu's Ship Augers dis 20 %
Watrous Ship Augers dis 20 %
Vaughan's Post Hole—
6 in. $3 60; 7, 8 and 9 in. $25 per doz. dis 30 %
Le. d's $4 00 each—dis 10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common per gross $1 20—dis 15 %
" " Best per gross $1 60—net
" Shouldered Peg per gross 2 25—dis 15 %
" Patent Peg per gross 60—dis 15 %
" Shouldered Brad per gross 2 25—dis 15 %
Brad Sets, Aiken's per doz $13 88—dis 40 %
" No. 42, $10 50; No. 43, $12 50 dis 5 % @ 60 %
" Clark's dis 50 %
" Stanley's Excelsior $18 50—dis 30&10 %

Axes.
Brook's per doz $12 00 @ 14 00 net
Blood's per doz $15 00 @ 16 50—dis 20 %
D. R. Barton Tool Co. ₩ doz $12 00 net
Hunt's, ₩ doz $12 50 @ 14 00
Collins' ₩ doz 10 00 @ 12 00 net @ dis 5 %
H. Clark's (J.C.W. & Co.) broil'd or red. ₩ doz $10, dis 5 %
Hurd's Razor Blade ₩ doz 9 50 @ 11 50
Simmons' ₩ doz 11 00 @ 14 50
Morris' ₩ doz 12 50 @ 13 50
Red Jacket ₩ doz 12 00 @ 12 50
Mann's ₩ doz 12 50 @ 14 00
" Double Bitted ₩ doz 23 00 @ 25 00
Underhill's ₩ doz 12 00 @ 13 00
" Crown ₩ doz 12 50 @ 13 50
John Leverett's ₩ doz 12 50 @ 15 50
Ten Eyck ₩ doz $11 00 @ 13 00 net
M. H. Jones & Co. ₩ doz 11 50 @ 13 00 net
Nobles Mfg. Co. per doz $10 50, net
Elephant per doz $9 50 @ 10 50 net

Axles.
Common (Guy C. Hotchkiss, Field & Co.) ₩ ℔ 4½c
Solid Collar, Case Hardened, Chilled Box ₩ ℔ 8c

Axle Grease.—Frazer's ₩ ℔ 8c.

Balances.
Light or "Common" dis 25&10 %
All other Spring Balances dis 25 %

Bands.—Iron
Iron dis new list dis 25&5 %
Band (Plated list) new list dis 50&5 %
Circle new list dis 50&5 %

Bed Keys.
Gray's Ratchet ₩ doz $4 00, dis 15 %

Bells.
Hand, Light Brass dis 70&10 @ 75 %
" Extra Heavy dis 60&10 %
" White Metal dis 20&10 %
" Silver Chime dis 25 %
" Swiss dis 20&10 %
" Globe (Cone's Patent) dis 20&10 %
Gong Abbe's dis 35&10 %
" Yankee dis 35&10 %
" Barton's dis 35 %
Crank, Taylor's dis 25&10 %
" Brook's dis 10 %
" Cone's dis 30&10 %
" Connel's dis 60&10&10 %
Lever, Sargent's net
" Taylor's Bronze or Plated Lever dis 25&10 %
" " Japanned Lever dis 50&10 %
" Hart, Bliven & Mead Mfg. Co dis 50&10 %
Pull dis 50 %
" Brook's dis 25&10 %
" Western dis 15 %
Call dis 30&10 %
Cow—Common Wrought dis 30&10 %
" Western dis 60&10 %
" Sargent's dis 20&10 %
" Kentucky "Star" dis 60&10 %
" " Sargent's dis 60&10 %
" Dodge's Genuine Kentucky, new list—

Nos.	0	1	1½	2	3	4	5	6	Hog.
	$12 00	10 00	9 00	8 00	6 00	5 00	3 50	2 50	5 00—dis 50 %

" Yaw's Genuine dis 40 %
" Texas dis 60

Bellows.
Blacksmiths', Common. List of Sept. 15 dis 25 %
" Extra and Pittsburgh Pattern dis 10 %
Moulders' dis 25 %
Hand Bellows dis 10 %

Blind Adjusters.—Domestic ₩ doz $3—dis 30 %

Blind Fasteners.
Mackrell's dis 30 %
Van Sand's, No. 3000, $14 00; No. 3705, $10 50 dis 5 %
Washburn's Patent ₩ gross $14 00 dis 5 %
Merriman's new list net

Blind Staples.
Boardman's Patent, ½ in. and larger ₩ ℔ 37 c
" ⅜ in " " 42 c

Blocks.
Differential Pulley Blocks dis 25 %
Tackle, Rope and Iron Strapped, Providence dis 30&10 %
Tod Co.'s list dis 10 %
Burr's dis 10 %
Stanley Rule and Level Co dis 25&10 %

Blowers.
Keystone Portable Forge Co. dis 20 %

Bolts.
Cast Iron Barrel, Shutter, &c. dis 60&10&10 %
Cast Iron Chain dis 60&20&10 %
Wrought Iron Barrel dis 50, 10&10 %
" " Square dis 60&10 %
" " Shutter dis 60&10 %
Wrought Iron Flush, Stanley's dis 15&10 %
" " " Sargent's dis 50&10&10 %
Carriage and Tire, Common dis 75 %
" " " Norway iron dis 30&10 %
" " " R. B. & W. (old list) dis 65&5 %
" " " Philadelphia dis 60&5 %
" " " Shelton's (old list) dis 60&10 %
Union Nut Company, old list dis 65&5 %
Stove—American Screw Co.'s dis 45 %
" R. B. & W. dis 40 %
" Shelton's Shaved Head dis 30 %
Machine dis 55 @ 60 %
Bolt Ends 12½ @ 13½c. ₩ ℔

Borax.

Boring Machines.	Upright.	Angular.
Hovey's, no Augers	$3 15	$4 00 net
" with Augers	5 00	6 00 net
Douglass' no Augers	5 50	7 50 dis 40 %
" with Augers	9 00	11 00 dis 40 %
Parr's, no Augers	5 00	7 00 dis 30 %
" with Augers	7 50	10 00 dis 30 %
Kellogg's, no Augers	5 25	6 75 dis 15 %
Sweets' "	3 25	4 00 net
" with Augers	5 00	6 00 net
Snell's "	4 75	6 25 dis 25 %
Phillips', with Augers		10 00 dis 25 %
Mortising Machines, $20 00 each		dis 20 %

Bow Pins.
Union Nut Co. new list dis 50&10&5 %
Hotchkiss' dis 50 @ 55 %
Humason, Beckley & Co.'s dis 50&10 %
Sargent & Co.'s dis 50&10&10 %

Braces.
Barber's Patent dis 40&5 %
C. S. Backus dis 40&10 %
Wilson Mfg. Co. dis 10 %
Pofford's Patent dis 50 %
Noble's Patent dis 40&5 %
Ives' Patent dis 40&10 %
Common Bail (American) dis 20&10 %

Brackets.—Shelf dis 60&10 @ 65&10 %

Bright Wire Goods dis 65&10&10 %

Bull Rings.—Union Nut Co dis 50&20 %
Sargent's dis 60&10 %
Hotchkiss' ½ in., ₩ ℔ 25 net
Humason, Beckley & Co.'s dis 50&10&5 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co dis 20&10 %
D. R. Barton Tool Co. dis 20 %
Stanley's dis 25 %
Beatty's 2 3 4 5 6 7 8 9
$19 00 $21 00 $24 00 $27 00 $30 00 $33 50 $36 50 $40 00
Hart Mfg. Co. dis 45&10 %
0 1 2 3 4 5 6
$26 25 $29 75 $34 25 $38 75 $43 25 $48 50 $54 00

Butts.
Wrought Brass dis 30 %
Cast Brass dis 20 %
COMMON CAST, NOT DRILLED.
Fast Joint, Narrow dis 30&10 %
" Broad dis 40&10 %
" Jap'd dis 35&10 %
Loose Joint, Narrow and Broad dis 50&10 %
" " " Jap'd dis 45&10 %
Parliament Butts & Mayer's Hinges dis 40&10 %
Loose Pin dis 45&10 %
Loose Pin Japanned dis 55&10 %
Loose Pin Jap'd, Plated Tips dis 50&10 %
DRILLED AND WIRED.
Fast Joint, Narrow dis 25&10 %
" Broad dis 35&10 %
Fast Joint, Broad, Japanned dis 30&10 %
Loose Joint dis 45&10 %
" Japanned dis 45&10 %
Parliament & Mayer's Hinges dis 35&10 %
Loose Pin, no Acorn dis 42½&10 %
" " Acorns dis 40&10 %
" " Japanned dis 50&10 %
" " " Plated Tips dis 45&10 %
Union Mfg. Co.'s Fancy Butts.—
Figured Enameled Loose Joint dis 55&10 %
Nickel Plated " dis 33⅓&10 %
Boston Finish, Plain dis 80&5 %
" " with Iron Acorns dis 75&5 %
" " with Sil'd dis 65&5 %
WROUGHT IRON.
Fast Joint, Narrow dis 40&10 %
" Lt. Narrow dis 30&10 %
" Broad dis 40&10 %
Loose Joint, Broad dis 40&10 %
Table Butts, Back Flaps, &c. dis 35&10 %
Inside Blind, Regular dis 35&10 %
" Light dis 40&10 %
Loose Pin, Wrt. dis 40&10 %
Am. Spiral Spring Butt Co., list May 1st dis 25 %
Union Spring Hinge Co. dis 20 %
Union Mfg. Co. Spring Hinges dis 25 %
Blind Butts, Parker dis 70&10 %
" Palmer dis 40 %
" Seymour dis 65&10 %
" Shepard dis 70&10 %
" Lull & Porter dis 60&10 %
" Nicholson dis 45&10 %
" Huffer dis 33⅓&10 %
" Garretson dis 70&10 %
" Clark's, Nos. 1, 3 and 5 dis 70&10 %
" Clark's No. 30 dis 70&10 %
" " Nos. 2 4 4½, 6, 8, 10 dis 55 %
" Sargent's dis 75&5&10 %

Can Openers.
Messenger's Comet per doz $3 00 dis 20 %
American per doz 2 25 dis 50 %
Lyman's per doz 3 75 dis 20 %
No. 4, French per doz 2 25 dis 50 %
No. 5, Iron Handle per doz 2 25 dis 50 %
Sprague's Nos. 1 2 3 4
Per doz $4 00 4 50 5 00 9 00 dis 55&10 %
Star per doz $6 50 dis 25&10 %
Eureka per doz $2 50 dis 10 %
Sardine Scissors per doz $7 00 dis 40 %

Caps—Percussion, per 1000. .37 @ 40c

Cartridges.—Metallic dis 30&10 %

Cards.—Horse and Curry dis 10&10 %
Cotton dis 10&10 %
Wool dis 15&10 %

Carpet Stretchers.
Cast Steel, Polished per doz $3 00 dis 30 %
Cast Iron, Steel Points per doz $2 00 dis 45&5 %

Casters.
Bed dis 40 @ 40&10 %
Plate and Shallow Socket dis 50 @ 55 %
Deep Socket dis 40 %

Cattle Guards.
Hotchkiss' Sons net
Humason, Beckley & Co.'s dis 60 %
Sargent's dis 60&10 %

Chain

English Coil					net gold
₩ ℔	11½	8⅝	7⅜	1¼	1¼ 7c
	8-16	½	5-16	⅜	5-16

Trace, 6½-10-2 by the cask, ₩ pair, gold 50 @ 52c
Trace, 7-10-2 by the cask, ₩ pair gold 55 @ 57c
German Halter Chain dis 25 % gold
German Coil dis 25 % gold
Galvanized Pump Chain ₩ ℔ 10½ @ 11c.
Jack Chain, Iron dis 50&10 %
" Brass dis 40&10 %

Chalk.
White ₩ gross, 50c net
Red ₩ gross, 75c net
Blue ₩ gross, 95c net
White Crayons ₩ gross, 15½c net

Chisels.
D. R. Barton Tool Co. (all kinds) dis 20 %
Socket Framing, Douglass, Extra dis 50&15&10 %
" " Crossman dis 50&10&10 %
" " Buck Bros. new list dis 15 @ 17½ %
" " Hart Mfg. Co. dis 60&10 %
" " Merrill dis 60&10 %
" Firmers, Douglass, Extra dis 60&10 %
" " Crossman dis 50&10&10 %
" " Buck Bros. new list dis 15 @ 17½ %
" " Hart Mfg. Co. dis 60&10 %
" " Merrill dis 60&10 %
Socket Corner dis 40 %
Tanged Firmers dis 40 %
" " Butcher's $5 25 to £ gold
" " Newbould's $5 50 to £ gold
" " Spear & Jackson's $5 00 to £ gold
" " Buck Bros (Shank) $5 25 to £ gold

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron dis 25 %
" Adjustable, Gray's dis 20 %
" " Lambert's dis 2 %
" " Snow's dis 5&5 %
" " Hammer's dis 25 %
" Cabinet, Sargent's dis 60&10 %
" Carriage Makers', Sargent's dis 60&10 %

Clips, Axle.
Norway or Best dis 40 %
Superior dis 55 %

Cockeves 1¼ in., 28c.; 1⅜ in., 33c.; 1¾ in., 37c. net

Cocks.
Brass Racking dis 40&5 @ 45 %
Lock and Globe dis 40&5 @ 45 %
Lever Bibbs dis 40&5 @ 45 %
Ale and Beer dis 25&10 %

Coffee Mills.
Board and Box dis 25 %
Brighton dis 20 %
Increase Wilson's dis 20 %
Selsor's Pat $9 50, $10 50—dis 25 %
American (Enterprise Mfg. Co.) dis 30 %
French Steel dis 25 %
The Swift dis 20 %

Compasses and Dividers.
Bemis & Call Co.'s dis 35&10 %
Cook's dis 15 %
Excelsior dis 40 %
Peck Stow & Wilcox dis 25 %
Miller's Patent dis 25&10 %

Coopers' Tools.
Bradley's dis 15 @ 20 %
Chas. E. Little dis 20 @ 25 %
D. R. Barton Tool Co. dis 20 %

Corkscrews.

Corn Knives and Cutters.
Bradley's dis 10 %

Crow Bars.
Cast Steel ₩ ℔ 11c. net
Iron, steel points ₩ ℔ 5c

Crucibles.—Gautier & Co. ₩ No. 5 $6

Curling Irons &c.
Curling Irons, ½ in., 1 in., $1 80, $2 00, $2 40 dis 10 %
Curling Tongs ₩ doz $6 50—dis 15 %
Pinching Irons ₩ doz 7 50—dis 30 %

Curry Combs.
Curry Comb Mfg. Co. dis 25&10 %
Hotchkiss' & Kellogg's, Iron & Brass, old list dis 40 %
Fitch's (List of No. 240, $1) dis 25&10 %
Rubber ₩ doz. $9 00—dis 15 %
Wood Tooth (Fuller Bros.) per doz $2 25 net

Curtain Pins.—Silvered Glass new list dis 15 %

Cutlery.

American Table	Meriden Cutlery Co	New list July '76, dis 25 %
American Pocket		dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co.		dis 20&10 %
Am. Miller Bro.'s Cutlery Co.		dis 25 %
Naugatuck Cutlery Co.		dis 25 %

Dippers.
Britannia per doz 7 50—dis 30 %; by bbl. dis 33⅓ %
Cocoa, Plain per doz $3 25—dis 20 %
" Rimmed per doz 3 75—dis 20 %

Dog Collars.
Embossed Gilt dis 20 %
Leather dis 30 %
Brass dis 25 %

Door Springs.
Torrey's Rod ₩ doz $2 50 net
Gray's " ₩ doz $2 50 net
Johnson's " ₩ doz $3 00 net
Gem (Coil)—
No. 1, Large, Japanned per doz $3 50
No. 2, Medium, " per doz 2 50 } dis 10 %
No. 3, Small, " per doz 2 00
Challenge (Coil)— Nos. 2 4 6
Japanned per doz $2 00 2 50 3 50
Coppered per doz 4 00 4 50 5 00 } dis 10 %
Galvanized per doz 3 50 4 00 4 50
Nickeled per doz 5 50 6 00 7 00
Philadelphia 5 in., $5 00; 8 in., $7 00 dis 15 %
Barker's Concealed dis 15 %

Drawing Knives.
Crossman's No. 1 dis 50&15&10 %
D. R. Barton Tool Co. dis 20 %
Douglass, Extra dis 60&10 %
Hart Mfg. Co., No. 1 dis 60&10 %
Merrill dis 60&10 %
Nobles Mfg. Co. dis 15 %
Bradley's dis 25 %
Adjustable Handle dis 15 %

Drills and Drill Stocks.
Blacksmiths' each $2 25 net
" Self-Feeding each $7 50 net
Breast, P. S. & W. dis 45 %
Breast, Aiken's dis 25&10 %
" Hotchkiss dis 10 %
" Wilson's dis 10%
" Miner's Falls each $2 50, dis 25 %
Ratchet, Merrill's dis 20 %
" Ingersoll's (old list) dis 35 %
" Whitney's dis 20 %
Ratchet, Weston's dis 20 %
" Moore's Triple Action dis 20 @ 25 %
Wilson's Drill Stocks dis 10 %
Automatic Boring Tools each $2 75—dis 20 %

Drill Chucks.
Danbury each $8 00, dis 30 %
Morse's Beach Patent dis 30 %
Adjustable each $10 00, dis 30 %

Egg Beaters.
Monroe's 8 in. 10 in.
Per doz $8 00 9 00 dis 10 %
National ₩ doz $4 50—dis 20 %

Emery.
Genuine Chester—Regular Nos. ₩ ℔ 6c } dis 10 %
" " Flour and FF. ₩ ℔ 4c }
Washington Mills—Regular Nos. ₩ ℔ 8c
" " Flour ₩ ℔ 5c
Wellington Mills, Grain ₩ ℔ 10c. net
" " Flour ₩ ℔ 8c. net

Enameled and Tinned Ware.
Kettles dis 40 @ 50 %
Sauce Pans dis 30 @ 35 %
Glue Kettles dis 30 @ 35 %
Tinned Saucepans dis 30 @ 35 %

Escutcheons.
Door Lock Same discounts as Door Locks
Brass Thread dis 60&10 %
Wood dis 25 %

Faucets.
Fenn's dis 50 %
" Cork Stops dis 40 %
Star dis 55&10 %
Frary's Patent Petroleum dis 20&10 %
Wood and Metallic dis 40 %
Wood, Cork Lined dis 65&10 %
Enterprise Mfg. Co., Self-Measuring dis 20 %

Felloe Plates. ₩ ℔ 15c; dis 35&10 %

Files.
American File Co. $5 00 to £ currency—dis 20 %
Arcade File Works $5 00 to £ currency
Auburn File Works $5 00 to £ currency
Nicholson new list, Jan. 1, 1875, dis 7½ %
C. B. Paul's $5 00 to £ currency
Heller & Bros $5 00 to £ currency
Hiscox File Mfg. Co. $5 00 to £ currency, dis 10 %
Johnson & Bro $5 00 to £ currency
Jowitt's 4 50 to £ gold
J. & Riley Carr 5 00 to £ gold
" " Horse Rasps 5 00 to £ gold
Stubs' 7 50 to £ gold
Butcher's 4 50 to £ gold
Walter Spencer & Co.'s "Diamond" 4 50 to £ gold
Spear & Jackson's 5 00 to £ gold
W. & C. Peace's "Imperial" 5 25 to £ gold
R. Hobson 5 00 to £ gold
Fisher's 4 75 to £ gold
Moss & Gamble 4 75 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.) 4 50 to £ gold
" " Horse Rasps 5 00 to £ gold
"Philo Sheffield," P. T. Co. 5 00 to £ gold
Limet & Co. (French) 4 25 to £ gold

Fluting Machines.
Mrs. Coles' 4 in., $4 75; 5 in. $5; 6 in. 5 50; 7 in. $6 dis 25 %
Vony 4 in., $4 75; 5 in. $5; 6 in. 5 50; 7 in. $6 dis 25 %
Knox, 4 inch Rolls $3 00 each net
" 6 " 3 50 each net
" 8 " 5 10 each net
Peerless, 4-inch Rolls 4 00 each net
" 5 " 4 75 each net
Improved Knox (Climax), 4 inch 2 65 each net
" 6 " 3 15 each net
" 8 " 4 90 each net
Champion, 6 inch rolls 6 00 each net
" 4 inch rolls 5 00 each net
Empire 4 00 each net
Eureka, No. 1, 4-inch Roll 6 75 each net
" No. 2, 5-inch Roll 5 00 each net
Defiance 4 in., $5 50; 6 in., $4 00; 8 in., $6 50 each net
K. F. M., 6¾-inch Roll 3 50 each net
" 4-inch Roll 4 00 each net
Crown, 4½ in. Roll, $3 75; 6 in., 4 00; 8 in., 5 25 each net
Domestic Fluter $1 50 each net
Geneva Hand Fluter $15 00 per doz net

Fluting Scissors. dis 30½ & 40 %

Forges.
"Empire" (W. P. Kellogg & Co.) dis 20 %
Keystone Portable Forge Co. dis 40 %

Forks.
Hay, Manure & Spading dis 30 %
Plated A 1 dis 40&5 %
" Reed & Barton dis 40&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co. dis 20 %

Fry Pans.
Burnished, P. S. & W., new list dis 55 %
₩ doz. $3 00 3 75 4 25 4 75 5 25 6 00 7 00 8 00 9 00
No. 0 1 2 3 4 5 6 7 8

Gauges.
Marking dis 45&10 %
" Star dis 35 %
Wire dis 10 %
" Smith's Patent per doz $18 00, dis 40 %

Gimlets.
Nail and Spike dis 25&10 %
"Bee" Gimlets per gross, $12 00, dis 45 %
Double Cut, Shepardson's dis 20 %
" " Hartwell's dis 40 %
" " Ives' dis 25 %
" " Douglass' dis 25&10 %

Glue Pots.
Tinned and Enameled dis 30 @ 35 %
Family, Howe's "Eureka" dis 25 %
" L. F. & C.'s "Handy" dis 25 %

Grind Stone Fixtures
Sargent's Patent dis 70&10 %
Reading Hardware Co. dis 70&10 %
Hart Mfg. Co.'s dis 60&5&10 %
Rick Bros. dis 45&5 %

Hammers.
Emmet Hammer Co.'s Handled dis 25 %
" " Sledge & Stone ₩ ℔ 40c.; dis 40 %
Humason & Beckley Mfg. Co. dis 16⅔&10 %
Maydole's dis 12 %
Henry Hammonds' dis 12½ %
Cheney's net @ dis 5 %
Verree's dis 5 %
Magnetic Tack dis 25&10 %
Weaver & Noole's dis 20 %

Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4 00 per pair } dis 25 %
" Leg Irons $6 50 per pair }
Providence Tool Co.'s Hand Cuffs, $15 per doz } dis 10 %
" " Leg Irons 25 " }

Handles.
Door or Thumb Latches—
Nos. 0 1 2 3 4
Per doz $0 80 1 00 1 18 1 35 1 50—dis 60&10 %
Roggin's Latches 35c. @ 40c. net
Bronzed Iron Drop Latches per doz $1 00 @ 1 25 net
Wrought Chest dis 60&10 %
Surface Chest dis 65&10&10 %
Flush Chest dis 60&10&10 %
Lifting dis 25&10 %
Saw and Plane dis 25&10 %
Hammer and Hatchet dis 10 %
N. Carolina Handle Co. dis 15 %
Brad Awl per gross $3 50, dis 40&10 %
Hickory Firmer Chisel, ass'td " 5 25
" " " large " 6 50
Apple " ass'td " 6 00
" " large " 7 50 } dis 33⅓
Socket " ass'td " 4 00 } @ 40 %
" Framing " " 7 00
File " " 4 00
Auger " " 6 50
" large " 8 00

Patent Auger, Ives' dis 25&10 %
" " Douglass' per set $1 25—dis 10 %
" " Swan's per set $1 00—dis 30&10 %

Hangers.
Barn Door dis 65&10 %
" Anti-Friction" No. 1, $1 25; No. 2, $1 50 ₩ pr. dis 40 %
Novelty dis 40 %
Challenge dis 40 %
Climax No. 2 ₩ pair $1 25, dis 40 %

Harness Snaps.
Henshaw's dis 25&10 %
Judd's dis 40 %
Fitch's (Bristol) dis 30 %
Hotchkiss' dis 10 %
Andrews' dis 25 %
Sargent's dis 50&10 %
New York Wire dis 20&20 %

Hatchets.—Isaiah Blood

Shingling, Nos.	1	2	3		dis 15 %
	₩ doz. $14 00	$17 00	$19 00	$30 00	dis 25 %
Miles Challenge	Nos 1	2	3		
	₩ doz. $22 00	$30 00	$40 00		dis 30 %
Perry's (P. S. & W.)	Nos. 200	300	400		
	₩ doz. $22 00	$27 00	$40 00		dis 25 %
Woodruff's (P. S. & W.)	Nos.	100	150		
	₩ doz. $15 00	$15 00			dis 25 %
Hales'	Nos.	11	12	13	
	₩ doz. $27 00	$33 00	$42 00		dis 40&2 %
Draw Cut	Nos.	5	6	7	
	Each $56 00	$90 00	$250 00		dis 20 %
American					dis 25 @ 25&5 %

No.	1	2	2½	3	4	11	5
Each	$6 00	$9 00	$12 00	$15 00	$30 00	$60 00	$75 00

Molasses Gates.
Stebbins' dis 62½&10 %
" Tinned ends dis 40&10 %
Bush's dis 20 %
Lincoln's dis 50&10 %
Weed's dis 15 %

Mortars and Pestles.
Iron net

Nail Pullers.
Taft's per doz $24 00 net

Nails. See Trade Report

Nuts and Washers.
Square and Hex., New List March 1, '76 .5c off list

Oilers.
Miller's Zinc, Brass and Copper dis 40 @ 45 %
Sheet Metal Screw, Zinc, Brass and Copper dis 40 @ 45 %
Olmsted's dis 25&10 %
Broughton's dis 25&10 %
Malleable per doz $5 00 dis 10 %
Prior's Patent or "Paragon" dis 40 %

Ox Bells. dis 60&10 %

Pencils
Faber's Carpenters' net
" Round Gilt ₩ gross $6 00 net
Dixon's Lead ₩ gross $4 50 net
" Lumber ₩ gross 9 00 net

Picture Nails and Knobs.
Brass Head dis 60&10 %
Porcelain Head dis 55&10 %
Richards' Patent dis 40 @ 40&10 %
Judd's dis 60&10 %

Pinking Irons. per doz $2 75—dis 65&10 %

Planes and Plane Irons.
First Quality dis 30&10 %
Second Quality dis 50 %
Bailey's Patent Adjustable dis 25&10 %
Bailey's "Victor" dis 25&10 %
Defiance Adjustable dis 25 %
D. R. Barton Tool Co. dis 30 %
Plane Irons, Butcher's $5 50 to £ gold—new list
" Buck Bros. $5 25 to £ gold
" Bailey's Patent dis 25&10 %
" Auburn Tool Co.'s dis 25 %
" Greenfield Tool Co. net list
Plane Irons, Defiance new list dis 25 %
" D. R. Barton Tool Co. dis 30 %
" Middletown Tool Co. net list
" Ohio Tool Co. dis 10 %
" Spear & Jackson's 5 00 to £ gold
" Sandusky Tool Co. dis 10 %
Plow Bits, Greenfield Tool Co. dis 10 %

Pliers and Nippers.
Button's Patent dis 33⅓ %
Hull's Patent Nippers, No. 1, $15; No. 2, $21 ₩ doz dis 25 %
Leach's Patent Wire Cutters per doz $6 50—dis 15 %
Gas Pliers dis 25 %
Eureka Pliers and Nippers dis 25 %

Plumbs and Levels.
Stanley R. & L. Co.'s Pat. Adjustable dis 60&10 %
" " " Non-Adjustable dis 60&10 %
Chapin's dis 60&10 %
Standard Rule Co.'s New Adjustable dis 60&10 %
Standard Rule Co.'s Non-Adjustable dis 60&10 %
Pocket Levels dis 50&10 %
Johnson's Patent Adjustable dis 60&10 %
Davis' Patent dis 60&10 %

Pulleys.
Judd's Axle per doz $0 75 dis 40 %
Hot House and Tackle dis 60&10 %
Jap'd Screw dis 60&10 %
Brass Screw dis 60&10 %
Jap'd Side dis 60&10 %
" Clothes Line dis 60&10 %
Hay Fork per doz $4 50 @ 5 00, dis 10 %

Pumps.
Douglas Cistern, etc. new list dis 25 %
" S. & F. new list dis 20 %
Union Mfg. Co's. Cistern and Pitcher dis 25 %
" " " Rams dis 20 %
" " " Garden Engines dis 10 %

Punches.
Belt or Drive per doz $2 00; $2 25; $2 50 dis 25 @ 30 %
Spring per doz $6 50—dis 25&10 %
" Leach's Patent dis 15 %
" Bemis' dis 20 %

Rail.
Sliding Door, Wrought Brass ₩ ℔ 40c. net
" Iron, Painted ₩ foot 9c—dis 55&10 %
Barn Door, ½, ⅝ and ¾ inch dis 60&10&10 %
" " for N. E. Hangers dis 60&10&10 %

Rakes.
Cast Steel dis 30 %

$8 00	9 00	10 00	11 00	
8	10	12	14	teeth.

Malleable dis 40 %

$5 00	5 50	6 00	6 50
9	11	13	15 teeth.

Razor Straps.
Evan's dis 40 %
Imitation Emerson ₩ doz $2 75—dis 40 %
Hunt's dis 40 %
Chapman dis 10 @ 15 %
Torrey's dis 10&10 %
Saunder's net @ 10 %

Rivets.
Iron and Tinned dis 60 @ 65 %
In bulk dis 40 @ 50 %
Copper Rivets and Burrs dis 20 %

Nos.	7	8	9	10	11	12	13	15
Per lb.	49c	50c	52c	54c	56c	58c	60c	65c 70c

Rivet Sets. dis 10 %

Road and Levee Scrapers.
Doty's Revolving dis 25 %

Rods.
Stair dis 40&10 %
" American Patent dis 33⅓ %

Rollers.
Barn Door revised list dis 60, 10&10 %
Novelty dis 10 %

Rope. Manufacturers' List of Aug. 19, 1876.
Manila ½ inch and larger ₩ ℔ 14 c
" ⅝ inch ₩ ℔ 14½c
" ¼ and 5-16 inch ₩ ℔ 15 c
Manila Tar'd Rope ₩ ℔ 13½c
" Tar'd Lath Yarn ₩ ℔ 15 c
" Hay Rope ₩ ℔ 14 c
Sisal ½ inch and larger ₩ ℔ 12c
" ⅜ inch ₩ ℔ 10½c
" ¼ and 5-16 inch ₩ ℔ 11 c
" Hay Rope ₩ ℔ 10 c

Rules.

	Boxwood.	Ivory.
Chapin's	dis 60&10 %	dis 50&10 %
Stanley	dis 60&10 %	dis 50&10 %
Standard	dis 60&10 %	dis 50&10 %
Stephens'	dis 60&10 %	dis 50&10 %

Sad Irons.
From 4 to 10 lbs. ₩ ℔ 3 @ 3¼c net
Sad Iron, Nickel Stand attached ₩ ℔ 9c
Self-Heating per doz $9 38 @ 9 50 net
" Tailors per doz $18 75 net
Mrs. Potts dis 20 %

Sand Paper.
Beadet & Adamson's Flint, 00 to 1½ $4 25 ₩ ream } dis
" " " 2, 2½ & 3 4 75 " } 15 %
" " " Assorted, 1 25 "
" Star ₩ ream $3 50 @ 11 50
" Emery ₩ ream $6 50 @ 11 50

New England, same list as B. & A. Flint dis 15 %
H. B. & M. Roman Flint " " " dis 15&5 %

Sash Cord.
Common ₩ ℔ 16 @ 18c. net
Patent ₩ ℔ 24c. net
Silver Lake, Russia Flax ₩ ℔ 55c } net
" " White Cotton ₩ ℔ 55c }
" " Drab Cotton ₩ ℔ 60c }
Raw Hide dis 25 %

Sash Locks.
Clark's, Nos. 1 and 2, $10 00 per gross dis 33⅓
Ferguson's dis 33⅓ %
Norwich dis 25 %
Walker's dis 10 %
New England dis 20 %
Hammond's Window Springs dis 25 %

Sash Weights.—Solid Eyes ₩ ℔ 1¾c

Sausage Stuffers or Fillers.
Miles ₩ doz $20—dis 30 %
Stow or Ferry ₩ doz No. 1, $15; No. 0, $21—dis 30 %
Draw Cut No. 4 each $30 00—dis 20 %
Enterprise Mfg. Co. dis 20 %

Saw Frames per gross $18 00—dis 15&10 %

Saw Rods. $10 list, dis 10&10 %

Saws.
Spear & Jackson's $3 50 to £ gold
Disston's Circular dis 25 %
" Mill dis 25 %
" Cross Cut dis 15 %
" Hand, Panel, Rip, &c. dis 15 %
H. W. Peace's Circulars dis 25 %
" Mill, Gang and Muley dis 25 %
" Cross Cut, Wood, Hand, &c. dis 20 %
E. M. Boynton's Lightning, Cross Cuts dis 40 %
" " One-Man, all lengths dis 40&10 %
" " Buck Saws (Cross Bar) per doz $8 50
" " Billet Webs per doz 6 00
" " Pruning dis 40&5 %
Wheeler & Clemson Mfg. Co.'s Hand dis 15 %
" " " Cross-Cut dis 30 %
Livingston's Butcher and Kitchen dis 15 %
Livingston's Framed Wood—

Nos.	101	102	103	104	105	106
Per doz	$12 00	10 00	12 00	9 00	8 00	6 00 dis 10 %

Saw Sets.
Stillman's Genuine ₩ doz $5 00—dis 10 %
" Imitation ₩ doz 3 25—dis

Blood's Excelsior and Granger...₩ doz 11 00
" Young America... 10 50 } dis $1·50
" Silver Clipper... 13 00 } from list.
Wadsworth's Grass...dis 30 %
" Bush...dis 20 %
Scythe Snaths...dis 30 %

Shears and Scissors.
Cast Steel...dis 75&10 %
Cast Iron...dis 40 %
Seymour's Straight Trimmers...dis 60&10 %
" Scissors...dis 50 %
Pruning...per doz $5·50 @ 6·00, net
Barnard's Lamp Trimmers...per doz $3·75

Sheaves.
Sliding Door, M. W. & Co. list...dis 35&5&2 %
" R. & E. list...dis 5&5&2 %
" Patent Roller...dis 25&2 %
" " " Hatfield's...dis 50&2 %
" Russell's Anti-Friction...dis 50&2 %
Sliding Shutter, R. & E. List...dis 30&5&2 %
" " Sargent's List...dis 35&10 %

Shovels and Spades.
Ames...dis 25 %
Rowland's...dis 25 %
Old Colony...dis 25 %
Middleboro' Shovel Co...dis 25 %
Dunning's Shovels and Scoops...dis 20&7½ %

Shovels and Tongs.
Iron and Brass Head, R. & E. list...dis 50&10&2 %
" " Hart's...dis 55&2&10 %
Polished Steel...dis 50&10&2 %

Slates.
Square Frames, Round Cornered, by case...dis 70 %
Less than a case...dis 65&10 %

Spokes.
North Carolina Handle Co...dis 20 %

Spoke Shaves.
Defiance Metallic...new list dis 25 %
Iron...dis 33⅓&10 %
Wood...dis 30 %
Bailey's...dis 25&10 %

Spoke Trimmers.
Bonney's...per doz $10·00 dis 40 %
Stearn's...per doz $10·00 dis 40 %
Tyes'...No. 1, $15·00; No. 2, $12·00 ₩ doz, dis 33⅓&10 %
Douglass'...per doz $9·00 dis 20&10 %

Spoons.
Tinned Iron...dis 10 %
By the case...dis 20%
Basting...dis 10 %
Britannia...dis 55 @ 60 %
" Boardman's, new list...dis 55 %
Rogers & Bro., A 1...dis 40&5 %
Reed & Barton...dis 40&5 %
Derby Silver Co...dis 40&5 %
Holmes, Booth & Haydens...dis 40&5 %
Nickel Silver Co...dis 30 %
German Silver...dis 30&5 %
Tin (P. S. & W.)—
Teas...$1·50 ₩ gross, net
Tables...2·75 " net
Tin (Cowles Hdw. Co.)...dis 10 %
" " case lots...dis 20 %

Stocks and Dies.
Stone.
Hindostan Stone...₩ ₺ 6c
" Axe Stone...₩ ₺ 8c } dis 20&10 %
" Slips...₩ ₺ 10c }
Sand Stone...₩ ₺ 6c—dis 20&10 %
Washita Stone...No. 1, ₩ ₺ 30c net
" No. 2, ₩ ₺ 25c net
" Slips...No. 1, ₩ ₺ 60c net
Arkansas Stone...No. 1, ₩ ₺ $1·35 net
" Slips...No. 1 ₩ ₺ $2·50 net
Grindstones, Family, Loring's...dis 10 %

Stove Polish.
Joseph Dixon's...₩ gross, 6 00
Gem...₩ gross $4·25 @ 4·50 net
Gold Medal...₩ gross $6 00 dis 25 %
Rising Sun...per gross $5·75 net

Squares.
Steel...dis 50 %; full cases, dis 50&10 %
Iron...dis 50 %; full cases, dis 50&10 %
Nickel Plated...add $2 50 @ $4 00 ₩ doz net
Try Squares and T Bevels...dis 45&10 %
Star Try Squares and Bevels...dis 35 %
Disston's Try Squares No. 1...dis 40 %
" No. 2...dis 45 %
" " Improved. Nos. 1 & 2...dis 30 %
Winterbottom's Try and Mitre...dis 20&10 %

Tacks, Brads, &c.—List of January 1, 1876.
Tacks, Half Weight, American...dis 75& }
" Full " " ...dis 5& }
" Half " Swedes...dis 65& }
" Full " " ...dis 30& } dis 10 %
" Carpet, Am. and Swedes...dis 10& } for cash
" " Leather Head...dis 10& }
" Copper...₩ ₺ 45c. dis }
Brads, Half Weight...dis 50&c }
Shoe Nails—
4-8ths and longer, 9c.; 3½-8ths, 9½c. ₺ ₺, dis 10 %
Trunk, Clout and Finishing Nails—
8 8 8 8 1 1¼ in. and over.
25 21 17 15 13 11c. ₩ ₺, dis 10 %
Double Pointed Tacks...dis 40 @ 40&5 %

Tap Borers.
Common and Ring...dis 20&10 %
Ives' Tap Borers...dis 10&10 @ 25 %
Enterprise Mfg Co...dis 20 %

Tapes, Measuring.
American Flask and Cap Co...dis 20 %
Eddy's...dis 20 %

Tea Trays.
American Tea Tray Co...dis 15 %

Thermometers.
Tin Case...dis 60 %

Toe Calks.
Winsted...₩ ₺ 13c., dis 10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion)...dis 20 %
Wood Bottom...per doz $12—dis 30&10 %
All Iron...per doz $19·50—dis 30&10 %
Nashua Lock Co.'s...per doz $18 00—dis 50 %

Tinners' Tools and Machines.
P. S. & W...dis 10 %

Traps.
Game, Newhouse...dis 25 %
" Peck, Stow & Wilcox...dis 30 %
" Hotchkiss...old list dis 30 %; new list dis 10 %
" Blake's Patent...dis 30 %
Mouse, Wood Choker...₩ doz holes, 15 @ 16c
" Patent Choker (Union Nut Co.)...₩ doz holes 16 @ 18c net
" Round, Wire...₩ doz $1 50 to 2 00 net
" Square, " ...₩ doz 2 00 to 2 50 net
" Cage, " ...₩ doz 2 50, dis 10 %
" Patent Self Setting...per doz holes 25c net
" Catch-em-alive...₩ doz $4·25 net

Trowels.
Lothrop's Brick and Plastering...dis 10 %
Disston's Brick and Plastering...dis 15 %
Peace's Plastering...dis 20 %
Rose's Brick...dis 5 %
Brades' Brick...gold. dis 10 %
Worrall's Brick and Plastering...dis 30 %
Garden...dis 25 %

Triers.
Butter and Cheese...dis 25 %

Ventilators (Window).
Nickel and Gilt...per dozen $16·00 @ 18·00

Vises.
Solid Box, Trenton...40 to 160 lbs., 16c.; 160 and over, 20c
" " Wilson's...30 to 160 lbs., 18c } dis 30 %
160 and over, 22c }
" " Peter Wrights...16c gold
Parallel, Parker's...dis 20 %
" Wilson's...dis 30&10 %
" Sargent's...dis 55&10 %
" Trenton...dis 20 %
" Backus and Union...dis 25 %
" Merrill's...dis 15 %
" Fisher & Norris...dis 15&10 %
" Buffalo...dis 25 %
" Stevens'...dis 25 %
" Simpson's Adjustable...dis 20 %
Saw Filers, Bonney's...per doz $20·00 dis 25 %
" Stearn's...per doz $20·00 dis 25 %
" Hopkins'...per doz $17·50 dis 10 %

Wheel Barrows.
Canal (Pugsley & Chapman)...new list dis 30 %
Coal, Garden and Stone (Pugsley & Chapman)...dis 30 %
Jacob's Pat. Self-Oiling R. R. and Canal...dis 25 %

Well Wheels.
Revised list...dis 60&10 %

Wire.
Brass and Copper...List of Oct. 27, 1875, net
Bright and Annealed...Nos. 0 @ 18 dis 45 @ 50 %
" " ... 19 @ 26 dis 50 @ 55 %
" " ... 27 @ 36 dis 55 @ 60 %
Coppered...0 @ 18 dis 40 @ 45 %
Galvanized, Nos. 9 to 9...₩ ₺ 8 @ 8½c net
Galvanized, Nos. 10 to 18...market list dis 15 @ 20 %
Tinned...dis 25 @ 30 %
Cast Steel...dis 15 @ 20 %
Tinned Broom Wire...dis 35 @ 40 %
Galvanized Telegraph, Nos. 8 and 9...₩ ₺ 9c
Galvanized Telegraph, Nos. 10 and 11...₩ ₺ 10c
" " " 12...₩ ₺ 10½c
Annealed Fence, Nos. 8 and 9...dis 50 %
" Grape, " 10 to 14...dis 50 %
Fence Staples...₩ ₺ 7½ @ 8c
Stubs' Steel Wire...$7 00 to 7 gold
Judd's Picture Wire...dis 50 %
Clothes Line Wire...per coil 50c. net

Wrenches.
American Adjustable...dis 45 %
Baxter's Adjustable "S" New List, May 1, '76...dis 30 %
" Diagonal " " ...dis 20 %
Collins & Co.'s...dis 45 %
Coes' Genuine...dis 40&10 %
" Pattern (Wrought)...dis 50&10 %
" " (Malleable)...dis 50&2 %
Diamond Hardware Co...dis 40 %
Lindsay's Patent...dis 25 %
Taft's Pattern...dis 70&10 %
Davis Patent Duplex...new list dis 25 %
Bemis & Call's Patent Combination...dis 20&5 %
" " Merrick's Pattern...dis 25&2½ %
" " Brigg's Patent...dis 30&5 %
Aiken's Pocket (Bright)...per doz $10·00—dis 50&10 %

Wringers. Less than 2 doz 2 doz lots
Providence, with Cog Wheels...$12·00 $10·00
Household, without " ...60·00 58·00
Universal, " " ...60·00 58·00
" with " ...72·00 70·00
Eureka, without " ...60·00 58 00
Novelty, " " ...60·00 58 00
" with " ...72·00 70·00
Sherman, " " ...72·00 70·00
" without " ...60·00 58·00
Reliance, with " ...69·00 67·00
Excelsior Bench Wringers...90·00 87·00
" for Set Tubs...82·00 79·00
Crown No. 2...60·00 58·00

Stamped Tin Ware.
Common Stamped Ware...dis 10 %
Stamped Deep and Retinned Ware...dis 20&10 %
Japanned Tin Ware...dis 5 %
Planished Tin Ware...dis 20 %

METALS.

IRON.—DUTY Bars, 1 to 1¾ cents per lb., Sheet, Band, Hoop and Scroll, 1¾ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1¼ cents per lb.

Pig Iron—AMERICAN.
Foundry No. 1...₩ ton, $22 00
Foundry No. 2..." 20 00
Gray Forge..." 19 00 @ 20 00

SCOTCH.
Coltness..." 28 00 @ 29 00
Glengarnock..." 27 00
Eglinton..." 26 00 @ 26 50

Bar Iron.
Am. Rehned, at mill...2·25c. @ 2·35c.

Rails.
American, at works, currency...₩ ton 39 00 @ 42 00
Old Rails..." 21 50 @ 22 00

Scrap.
Wrought Scrap, from yard...." 27 00 @ 28 00

Bar Iron from Store.
Common Iron.
¾ to 2 in. round and square... } ₩ ₺ 2·2c
to 6 in. x ¾ to 1 in... }
Refined Iron.
¾ to 2 in round and square... } ₩ ₺ 2·5c
1 to 6 in. x ¾ to 1 in... }
1 to 6 in. x ¼ and 5-16, and 1 to 6 in. x 1¼ to 2.. ₩ ₺ 2·7c
Rods—¾ and 11-16 round and square... ₩ ₺ 2·6c
Bands—1 to 6 x 12 to 5-16... ₩ ₺ 2·9c
Swedish Iron.
Ordinary sizes... 130 00 @ 132 50
Plow size...

Sheet Iron.

	American and English.	Common English.	R. G. American.	R. G. English.
Nos. 10 to 20	₩ ₺ 3¼ @ 3½c	4¼ @ 4¾c		5¼c
21 to 24	" 4c	5c		5½c
25 to 26	" 4¼c	5¼c		5¾c
27	" 4½c	5½c		6c
28	" 4¾c			6¼c

Galvanized, 14 to 20, prime, ₩ ₺ 8¼c; 2d quality ₩ ₺ 7¼c
" 21 to 24 " " 8 c " " .8 c
" 25 to 26 " " 9¼c " " 8¾c
" 27 " " 10½c " " 9½c
" 28 " " 11¾c " " 10 c
Patent Planished...A, 12c.; B, 10c. ₩ ₺
Russia, Nos. 8 to 16...." 13½c
" Stained, No. 1...." 12½c
Belgian...10c
One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON.

⅛	5	5½	6	7 inch.
$2·50	3·50	4·50	5·25	6·50 per doz.

RUSSIA IRON.

1½	5	5½	6	7 inch.
5·00	7 00	9·50	12·00	14·00 per doz.

COPPER—DUTY. Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ ₺; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot...₩ ₺ 20 @ 20½c
English " "

SHEATHING, BRAZIERS COPPER, BOLTS, &C.
Braziers Copper, ordinary sizes, over 16 oz., per square foot...32c ₩ ₺
Braziers Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot...34c. "
Braziers' Copper, 12 oz. per square foot...36c. "
Circles less than 24 inch in diameter...35c "
Circles, 24 inch diameter and over...38c. "
Segment and Pattern Sheets...36c. "
Locomotive Fire Box Sheets...32c. "
Sheathing Copper, over 12 oz. per sq. ft...31c. "
" " 12 oz. ₩ sq. ft. and lighter...36c. "
Bolt Copper...32c. "
Copper Bottoms, 38c. ₩ ₺...net
No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.
Sheathing Copper, tinned on one side, by the case...6c. ₩ sheet
For less than a case...8c ₩ sheet
Tinning Sheets, ordinary sizes...2½c. ₩ sq. ft
For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER.
14x48.
14 and 16 oz. and heavier...37c. By the case, 36c. ₩ ₺
12 oz. and lighter...40c. " " 39c. "
Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier...39c. By the case, 38c. ₩ ₺
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier...41c. ₩ ₺
12 oz...44c. "

Brass.
Brown & Sharp's Gauge the Standard except for Fine Wire.

BRASS MANUFACTURERS' PRICE LIST.
October 27th, 1875.
Net cash prices for Roll and Sheet Brass, Wire, &c., for quantities of 100 pounds and over at one time. For less than 100 pounds, three cents additional.

HIGH BRASS
All Nos. to No. 28, and widths 14 in. and under...27c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive...30c
Over 20 in. to 30 in., inclusive...33c
½c. ₩ ₺ advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass. at...45c
Sheets 24x48 in. and all sheets cut to particular sizes and lengths...33c
Printers' Rules...40c
Sheets wider than 30 in. and under 40 in...40c
" " 40 in. and over...42c
Circular sheets, in diam. from 4 in. to 14, inclusive...37c
" " " over 14 " 30, " ...40c
" " " " 30 " 30, " ...43c
" " " " 30 " 40, " ...46c
" " " " 40 in...49c

LOW BRASS.
Four cents ₩ ₺ more than High Brass.
Gilding Metal 7c, ₩ ₺ more than High Brass.
Platers' or Gold Metal } in Bars...42c
} Sawed...45c
} Planed or Polished...48c

FOR SLITTING.
Metal, in width 2 in. to ½ in. to No. 30, inclusive, 1c. per ₺. advance.
Metal, in width 2 in. to 1 in., thinner than No. 30, 2c. per ₺. advance.
Metal, in width 1 in. to ½ thinner than No. 30, 3c. per ₺. advance.
Metal, in width ½ in. to ¼, to No. 30, 3c. per ₺. advance.
Metal, in width ½ in. to ⅛ thinner than No. 30, 5c. per ₺. advance.
Metal, ¼ in. in width and less, 10c. per lb. advance

GERMAN SILVER MARKET METAL AND WIRE

	Market Metal.	Wire.
4 per cent., 12 in., to No. 26	₩ 80	₩ 80
6 " " "	·70	·90
10 " " "	·80	1·10
15 " " "	1·00	1.35
18 " " "	1·10	1·50
20 " " "	1·20	

German Silver Sheets over 12 in. wide, and weighing more than 16 ₺s., $2 per ₺., net.
Advance 2c. for each additional in., in width above 12 in., and 2c. per ₺. on each No. thinner than Nos. 26 to 36 inclusive.
All German Silver thinner than No. 36 is Platers' at 50c. per ₺. additional.
German Silver Scrap one-third less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
Nos. 0 to 20	0·30	0·34	0·40
Nos. 21, 22, 23	0·31	0·35	0·42
Nos. 24 and 25	0·32	0·36	0·43
Brass Rods, No. 8 and larger	0·36	0·40	0·46
Wire straightened and cut, smaller than No. 8	0·40	0·44	0·50

Fancy Wire not less than 4 cents per pound advance of Round Wire.
Spring Wire, 2 cts. per lb. advance.

FINE WIRE, BY THE OLD ENGLISH FINE WIRE GAUGE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 26	0·41	0·45	0·51
No. 27	0·44	0·48	0·54
No. 28	0·46	0·50	0·56
No. 29	0·48	0·52	0·58
No. 30	0·50	0·54	0·62
No. 31	0·52	0·56	0·66
No. 32	0·56	0·60	0·71
No. 33	0·60	0·64	0·81
No. 34	0·64	0·68	0·91
No. 35	0·69	0·73	1·03
No. 36	0·78	0·82	1·15
No. 37	0·98	0·98	1·28
No. 38	1·24	1·28	1·58

Ten cents per pound extra for Spooling.

TUBING. ₩ ₺
Plain to No. 20 inclusive, above ¼ in. to 3 in... ... $ ·44
" above 3 in... ·50
Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.
Plain ¼ inch...
" 3-16 " ...1·10
" ⅛ " ...1·60
All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing, 4 cents advance on List above Plain.
English, Scotch and Extra Patterns Fancy Tubing to No. 20, 9 cents above Plain.
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ⅛ cent for each additional cutting under two feet.
All Mandrel Drawn Tubes under ⅜ in., 25 cents per pound advance.

ZINC TUBING.
Plain...28
Fancy...31
Scotch and Extra Patterns...34

GERMAN SILVER TUBING
4 Per cent...85
6 " ...95
9 " ...1·10
12 " ...1·25
15 " ...1·40
16 Per cent...1·45
18 " ...1·55
20 " ...1·65

MISCELLANEOUS.
Common Plain Brass Pail Ears...39
Hose Pipes, 500 and over...71
" under 500...76
Door Rail...90

SCRAP.
High Brass Scrap, 16 cents.
Low " 18 cents.
Gilding, 20 cents.
Turnings, Filings and Chips, half the price of Scrap.
Orders for Goods on this list received on or after this date, will be filled at the rate herein stated.
Terms—Net cash. No discount allowed. Interest to be added after thirty days.

ANTIMONY...15¾ @ 15¼c. gold

LEAD—DUTY: Pig $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb.

Spanish	6¾ @ 6¾c gold
German Refined	6¾c gold
English	6¾ @ 7c gold
American	6¾ @ 6¾c gold
Bar...dis 10 %...	8¼c.
Pipe...dis 10 %...	9½c.
Tin Lined Pipe...dis 10 %...	10½c.
Sheet...dis 10 %...	10c.
Shot...dis 10 %. Drop, 9¾c.	Buck, 10¾c.

BABBITT METAL.
N. P. U...₩ ₺ 8½ @ 9c
A., 25c.; B, 30c.; C, 15c.; D, 12c. ₩ ₺.

SOLDER...No. 1, 13¼c.; No. 2, 12¼c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3½ cents per lb, and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.
Tool...15 @ 16c
Spring...10c
Homogeneous...12½c
Tire...12½ @ 13½c
Machinery (round and square)...10 @ 11c
File...11c
Sheet...14 @ 16c
Saw Plate, mill and mulay...14 @ 16½c
Saw Plate, gang and X cut...13 @ 14c
" circular as to size...18 @ 30c

Chrome Steel.
Tool...₩ ₺ 20 @ 21c
Tool, extra fine...40 @ 75c
Spring...₩ ₺ 12c and upward
Machinery...₩ ₺ 14c
Hammer...15c,
Gun or Homogeneous...16c

English Steel,—payable in gold, net.
Best Cast...₩ ₺ 17½c
Extra Cast..." 18½c
Round Machinery, Cast...₩ ₺ 10½ @ 11½c
Swaged, Cast..." 19½c
Best Double Shear..." 17½c
Blister, 1st quality..." 14½c
" 2d quality..." 13 c
German Steel, Best..." 11½c
do 2d quality..." 10½c
3d quality..." 9½c
Sheet Cast Steel, 1st quality..." 17½c
" " 2d quality..." 14½c
" " 3d quality..." 12½c
File Steel, Flat and ½ Round..." 12½c
" Square and Round..." 12½c
" Mill..." 13½c
" Taper to 4 inch..." 16c
" Taper 3 and 3½ inch..." 18c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.
Silesian, cash...6¾ @ 7c., gold
American " ...7¾ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 1·1c per lb.; Electro-galvanized Plates, 2 cents per ₺; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.
Banca...₩ ₺ 23c., currency
Straits...₩ ₺ 21c., currency
English...₩ ₺ 21c., currency

TIN PLATES, CURRENCY PRICES.
I C 10x14, Prime Charcoal...8·25 @ 8·50
12x12, " ...8·75 @ 9·00
14x20, " ...9·00 @ 9·25
I X 10x14, " ...10·50 @ 10·75
12x12, " ...11·00 @ 11·25
14x20, " ...11·50 @ 11·75
D C 12½x17 " ...7·75 @ 8·00
D X 12½x17 " ...10·25 @ 10·50
For each additional X add...2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$8·00	7·35	7·00 @ 7·25
I C 12x12	8·50	8·25	7·50 @ 7·75
I C 14x20	8·75	8·25	7·25 @ 7·75

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$7·50 @ 7·75	7·25	6·75 @ 7·00
I X 14x20	9·75		
I C 20x28	15·75	14·75 @ 15·25	14·25 @ 14·75
I X 20x28	20·25		
I C 20x20	21·75		
I C 14x20 M. F. Brand			$8·50

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ₩ ₺.
Sheet...cask 9 @ 9¼c
" ...open 9¾c

Paper Stock, Old Metals, & c.

(Dealers' Selling Price.)

Canvas linen	6 @
" cotton, No. 1	6
" No.	@ 3½
White linen rags, No. 1	5½ @
" No. 2	4½ @
Colored	2½ @
Mixed woolens	2½ @ 3½
Soft woolens	3½ @
Gunny bagging	2 @ 2⅛
Jute Butts	2½ @ 2⅝
Kentucky bagging	3½ @ 5½
Waste paper and scraps	@ 1·5
Rope cuttings	1½ @ 3
Kentucky Bale rope	4 @ 4½
Oakum junk, No. 1	5½ @ 5¾
" No. 2	@ 4
Grass rope	3½
Tarred Shaking	2
White Colar Cuttings, all paper	7 @
" " muslin lined	5 @
" Envelope "	7 @
Hard White Shavings, No. 1	6½ @
Soft " " No. 1	6 @
White Shavings, No. 2	5½ @
Mixed Shavings, part white	4 @ 4⅜
Imperfections, No. 2, best folded sheets	5 @
" " L Heavy Stock	4⅜ @
Book Stock, Mixed	3½ @
" " No. 2, light	2½ @ 2⅝
Newspaper Stock	3
Printe	1½ @ 2
Pure Manilas	2¼
Bogus Manilas and Hardwares	1 @ 1⅛
Commons	1 @
Binders' Board Cuttings	1⅜ @
Straw Board Cuttings	1¼ @
Woolen Tailor Clips	13 @ 14
Satinet Tailor Clips	2 @

Old Metal.

Copper	@ 16
Yellow metal	13½ @
Brass, light	9½
Brass, mixed	10
Heavy Composition	13½
Old lead, solid	6 @ 6¾
Tea lead	6
Zinc	@ 4½
Pewter, No. 1	15
" No. 2	10 @ 12
Spelter	@ 6¾
Wrought Iron	per ton $24·00
Machinery Iron	per ton $12·00
Light Iron	per ton $13·00
Stove plate	per ton $9·00
Burnt Iron	per ton $7·00

Paints, Oils, etc.

Paints.

Black lamp—Coach Painters	₩ ₺ 20c
" " Ordinary	.6c
" Ivory Drop, fair	15c
" " best	26c
Black Paint, in oil...kegs, 8c.; asst'd cans, 11 c	
Blue, Prussian, fair to best	50 @ 7
" " " in oil	35 @ 65c
" Chinese dry	83c
" Ultamarine	25 @ 30c
Brown, Spanish	1¼c
" Van Dyke	9c
Carmine, 40	$12 00
Green, Carome	15 @ 23c
" " in oil	18 @ 25c
" Paris	good, 30c; best, 40c
" " in oil	30c " 45c
Mineral Paints	1¾ @ 4c
Orange Mineral	14c
Red Lead, American	9¼c
" " English	10¾ @ 11c
" Venetian (N. C.) dry	2½c
" " in oil	asst'd cans, 11c; kegs, 8½c
" Indian, dry	10c
Rose Pink	18c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 26c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw "	3½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	1 15, gold
" English	72½c. gold
" Trieste	1 10 "
" American, Common	25c
White Lead, American, pure dry	10c
" " in oil	10½c
White, Paris, English, prime	in bbls. 2¼ @ 2½c
Yellow Ochre, French	2¾ @ 2¾c
" " " in oil	asst'd cans, 11c; kegs, 8¼c
" " Vermont	in casks 1½c
Yellow Chrome	17 @ 27c
" " in oil	18 @ 28c
Zinc White, American No 1 dry	9c
" " 1, in oil	11c
" French (Paris)	1c
" " in oil	15c

Oils.

Linseed Raw...₩ gal. casks, 52c. bbl., 58c	
" Boiled..." 57c. " 58c	
Whale, Crude..."	
" Bleached Winter..." 75c	
Sperm, Crude...obl. 1·40	
" Winter unbleached..." 1·85	
" " Bleached..." 1 95	
Seal, Extra Refined..."	
Lard, Pure Winter..." 1·15	
" Spring..." 1·05	
Cotton Seed, Crude..." 62c	
" Southern Yellow..." 67c	
" White..."	
Neatsfoot, Winter...70c @ $1·10	
Natural Lubricating...38c @ 40c	

Sundries.

Asphaltum	9c
Benzine...₩ gal. 16c	
Chalk...₩ c	
" Block	
Dryer, Patent, Am'n...ass't cans, 10½c.; kegs, 9c	
" " English..." 11c.; " 9c	
Flocks	
Frostings	5c
Glue, White	38 @ 44c
" Sheet	28c
Glaziers' Points, Zinc	90
Gum, Copal	9c
" Damar	25c
" Shellac, English	55c
" " " dark	50c
Litnarge	9½c
Pumice Stone, selected Lumps	4 @ 5c
" powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	31c
Whiting, Spanish	¾ c

Glass.

FRENCH WINDOW GLASS.
Prices current per box of 50 feet.

Single Thick.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 7·50	$ 6·75	$ 6·25	5·75
11 x 14 to 16 x 24	8·50	7·75	7·25	6·50
18 x 22 to 20 x 30	10·75	9·75	8·75	7·75
15 x 36 to 24 x 30	12·25	10·75	9·00	
26 x 28 to 24 x 36	13·00	11·50	9·75	
28 x 36 to 26 x 44	14·50	13·25	10·75	
26 x 46 to 30 x 50	15·00	14·00	11·25	
30 x 52 to 30 x 54	16·00	14·50	12·00	
30 x 56 to 34 x 6	17·25	15·50	13·50	
34 x 58 to 34 x 60	18·25	17·25	15·00	
36 x 60 to 40 x 60	20·75	18·75	17·25	

Double Thick.

SIZES.	1st.	2d.	3d.	4th
6 x 8 to 10 x 15	$12·00	$11·00	$10·00	$ 9·25
11 x 14 to 16 x 24	13·75	12·50	11·75	10·50
18 x 22 to 20 x 30	17·25	15·75	14·00	
15 x 36 to 24 x 30	19·75	17·25	14·50	
26 x 28 to 24 x 36	21·00	18·50	15·75	
26 x 36 to 26 x 44	23·25	21·25	17·25	
26 x 46 to 30 x 50	24·00	22·50	18·00	
30 x 52 to 30 x 54	25·75	23·25	19·25	
30 x 56 to 34 x 56	27·75	25·00	21·75	
34 x 58 to 34 x 60	29·25	27·75	24·00	
36 x 60 to 40 x 60	33·25	30·00	27·75	

Sizes above 40 x 60—$10·00 per box extra for every five inches.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.
Discount 50&15 %.

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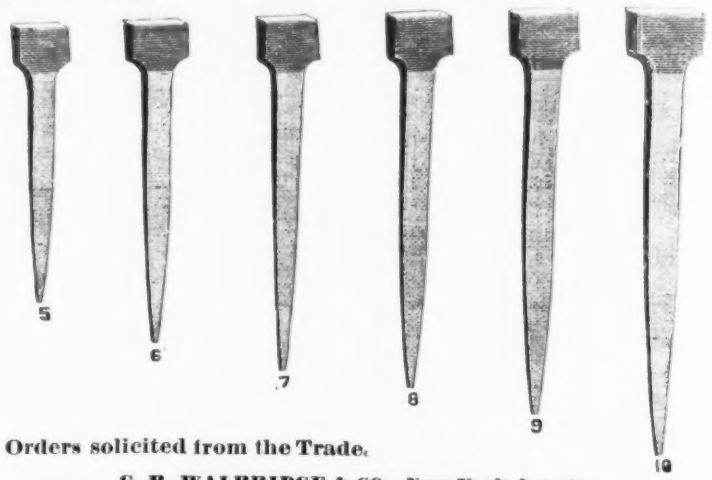
Manufacturers of the Superior Brand,
BUFFALO FORGED HORSE NAILS.
These Nails are superior, being made with new and improved machinery and actually hammered from the very best brands of **Norway Iron.**



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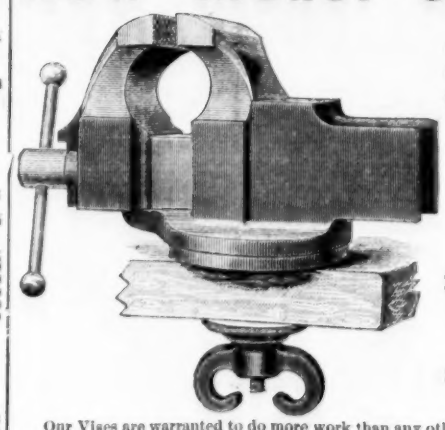
PATENTED Dec. 24, 1872.

Three Patterns.—Twenty-Three Designs.
MOST POPULAR GOODS IN MARKET.
Illustrated Price Lists supplied upon application.
SOLE MANUFACTURERS
SIDNEY SHEPARD & CO., Buffalo, N. Y.

New Model Swivel Vise.



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Our Vises are warranted to do more work than any other make. No broken boxes or screws.

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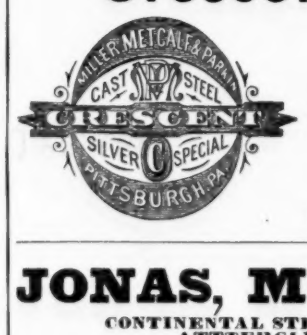

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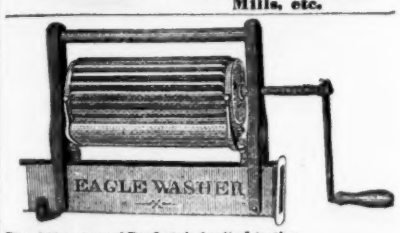

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LIMITED.

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General Office and Works at Bessemer Station (Penn. R. R.), Allegheny County, Pa.

New York Office, 57 Broadway.

The members of the Edgar Thomson Steel Company, Limited, have had large experience in manufacturing and in railway management; their works are the most complete in the world, with all the late improvements, and are located in the best Bessemer metal district in the United States, and their managing officers are experienced in the manufacture of Bessemer Steel.

The Company warrants its rails equal in quality to any manufactured in the United States.

Rails of any weight or section furnished on short notice. Orders for trial lots solicited.

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D. McCANDLESS, Chairman. **WM. P. SHINN, General Manager.**

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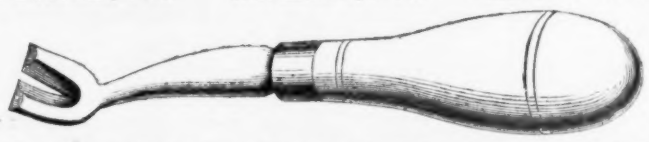

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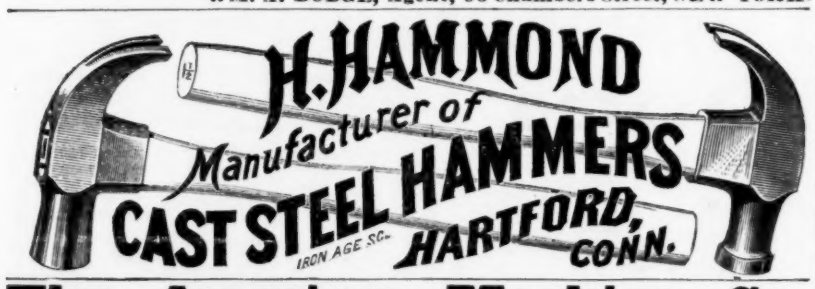

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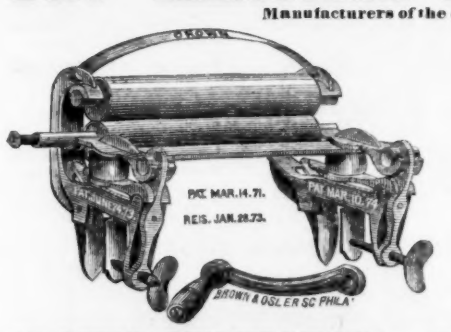

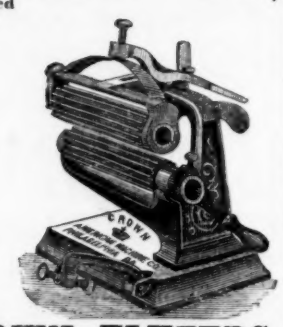

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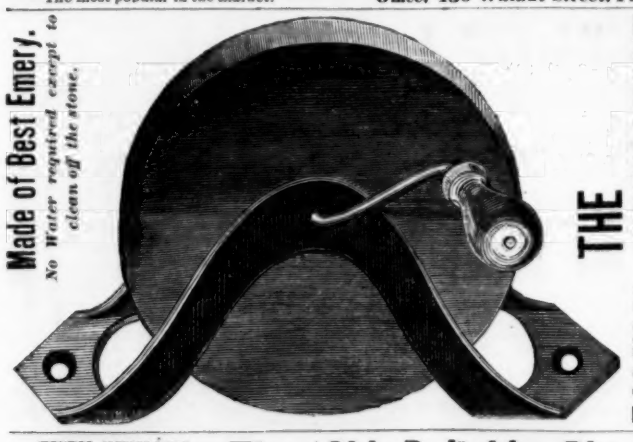

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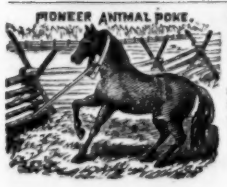

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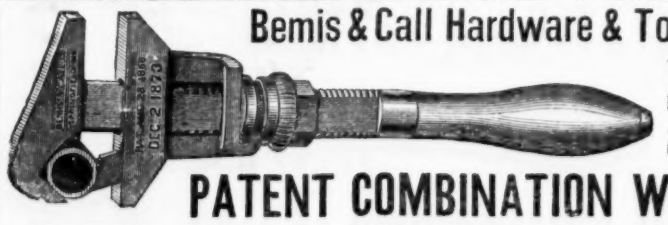

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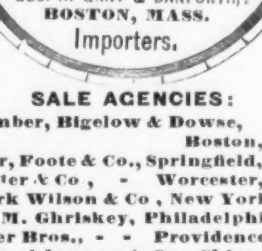

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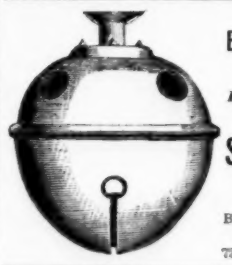

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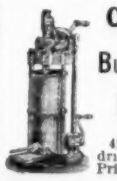

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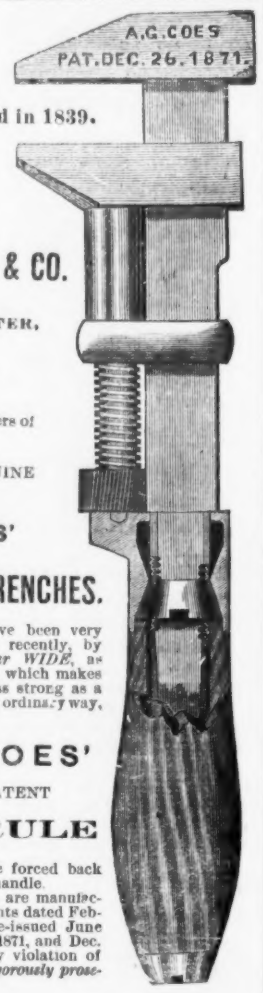

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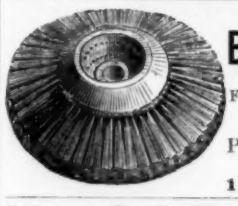

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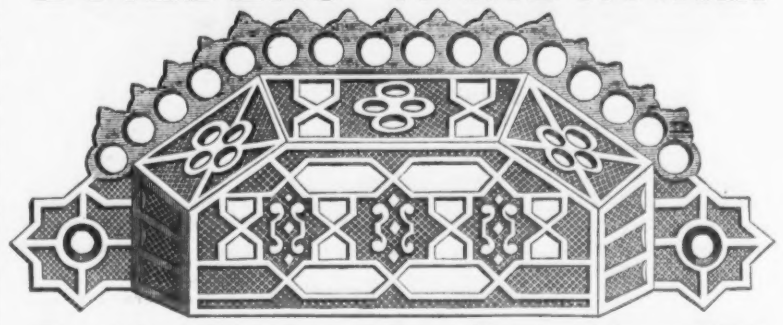

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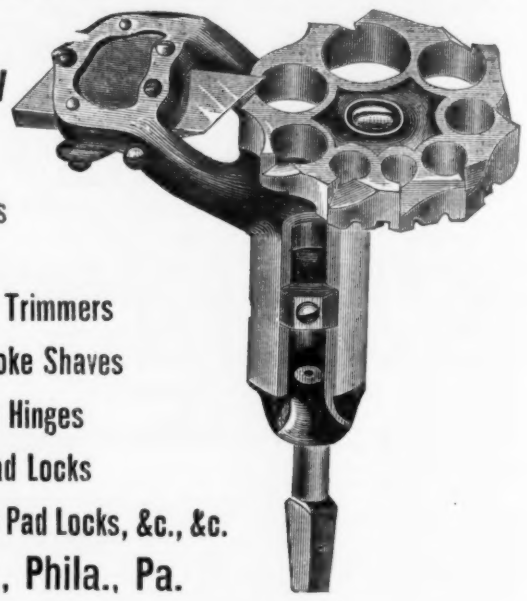

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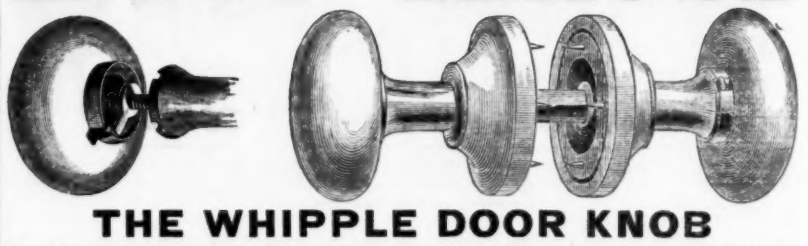

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" Acorn, Loose Pin.....dis 40&10 @ 45&10 %
Mayers & Parliament.....dis 35&10 @ 40&10 %
" Acorn Jap'd.....dis 45&10 @ 50&10 %
Wrought Loose Pin.....dis 40&5 %
" Table Hinges and Back Flaps.....dis 35&5 %
" Narrow.....dis 40&5 %
" Loose Joint.....dis 40&5 %
Parker's Blind Butts.....
Buffalo Hdw. Co. " ..... } Discount 65&10 %: by the
Clark's " ..... } case 70 %.
Shepard " .....
Lull & Porter's (Phila.) Hinges....dis 65 %, case, 60&5 %
Garretson's No. 0 Hinges..... } dis 50&10 %
Cherrytree No. 0 " ..... }

Chains.—German Halter and Coil.....dis 30 @ 25%
Galvanized Pump.....net 18 @ 13½c
Best Proof Coil Chain—

₱ ℔	12½	9½	8¾	8¼	8	7¾	7c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 500 lbs., ½c per lb. less Common Chain, ¼c per lb. less.

Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang " .....dis 40 %
Beatty's Framing and Firmer.....dis 20 %

Casters.—Iron Bed.....dis 40&10 %
Porcelain Wheel Bed.....dis 50&10 %
Iron and Brass Wheel Plate.....dis 40&10 %
Porcelain Wheel .....dis 50&10 %

Clothes Wringers.—Universal.....per doz $72 00
Novelty " 72 00
Monitor " 70 00
Discount on 2 dozen lots, $2 per dozen

Coffee Mills.—Common Box and Side.....dis 20 %
Patent Box and Side.....dis 20 %

Cutlery.—American Pocket (best).....dis 30 @ 33⅓ %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices

Drawing Knives.—Hart Mfg. Co.'s.....dis 60 %
Adjustable Handle.....dis 10 @ 15 %
Beatty " .....dis 15 @ 20 %

Fry Pans.
Tinned.....dis 40 @ 45 %

₱ doz..	$3·50	4·00	4·50	5·00	5·50	6·50	7·50	9·00	10·00
No....	0	1	2	3	4	5	6	7	8

Burnished.....dis 40 @ 45 %

₱ doz..	$3·00	3·75	4·25	4·75	5·25	6·00	7·00	8·00	9·00
No....	0	1	2	3	4	5	6	7	8

Files.
Nicholson Mill Files.....new list
" Bastard.....
" Taper.....
Butcher's Mill.....₱ £ gold $4 75 @ $4 50
" Bastard.....₱ £ gold 4 75 @ 4 50
" Taper .....₱ £ gold 4 75 @ 4 50

Fluting Machines.
Mrs Knox—4¼ in. rolls.....each $3 50 net
" —6 in. rolls..... " 4 00 net
" —8 in. roll..... " 8 00 net
Imperial—4¼ in. roll..... " 3 50 net
" —6 in. roll..... " 4 00 net
Crown—4¼ in. roll..... " 3 50 net
" —6 in. roll..... " 4 00 net

Hammers.
Yerkes & Plumb's.....dis 15 @ 20 %
Hammond & Son's.....dis 15 @ 20 %
Veree.....dis 20 @ 25 %

Hatchets.
Beatty's.....dis 25 %

Shingling and Half.	₱ doz.	$7·00	7·50	7·75	8·00
	No.	1	2	3	

Yerkes & Plumb.....dis 15 @ 20 %

Shingling and Half.	₱ doz.	$7·00	7·50	8·00	8·50
	No.	1	2	3	4

Claw	₱ doz.	$7·50	8·00	
	No.	1	2	3

Hinges.
Strap and T .....dis 60 @ 60&5 %

Horse Nails.

	Nos.	6	7	8	9	10
Ausable		27	25	24	23	22
Globe		28	26	25	24	23
Brundage		26	24	23	22	21
	Nos.	5	6	7	8	9
Putnam		32	28	26	25	24

On Ausable Globe and Brundage 1000 ℔ lots.....dis 5 %

Knobs.—
Door Mortise and Rim, Mineral and Porcelain..... { New list; Discount 35 @ 35&5 %

Locks and Latches.
Door Locks, Rim and Mortise..... dis 35 @ 35&5 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 35 @ 35&5 %
Scandinavian Pad Locks.

₱ doz.....	$10·50	10·50	12·00	12·00	13·00	15·00	15·00	45&5 %
No.....	59	59½	60	60½	61	61½		
₱ doz.....	$18·00		18·00		22·00		22·00	45&5 %
No.....	62		62½		63		63½	

Trunk Locks.....dis 25 %
Thumb and Roggens Latches.....dis 25 %

Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %

Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 62½ @ 62½&10 %
Lincoln's " .....dis 40&10 @ 50 %
Landers, Frary & Clark's Petroleum.....dis 15&10 %
Taylor's Petroleum Faucets.....dis 20&10 %
Brass Liquor Cocks.....dis 40 %

Meat Cutters.—Dixon's.....dis 25 %
Woodruff.....dis 25 %
Stowe.....dis 25 %
Hale's.....dis 33 %
Stuffers.....dis 25 %

Planes.—Auburn Tool Co.'s Beach.....dis 40 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net

Plumbs and Levels.
Adjustable.....dis 60&10 %
Non-Adjustable.....dis 60&10 %

Plane Irons.—American.....list net
Butcher's.....gold £, $5 00

Picks.—Philadelphia.....net
Pittsburgh.....net

Rules .....dis 60&10 %

Rakes.—Cast Steel Garden.....dis 40 @ 40&5 %
Malleable Garden.....dis 40 @ 40&5 %
Wood Head Iron Teeth.....dis 40 %

Steelyards.—American Pattern.....dis 20 %

₱ doz.....	$5·50	7·00	9·00	10·00	12·00
No.....	50	100	150	200	250

English Pattern.....dis 15 %

₱ doz.....	$7·00	8·67	10·67	12·67	14·67	16·67
No.....	50	100	150	200	250	300

Hart's Pattern.....dis 50 %

₱ doz.....	$14·50	17·75	21·00	26·50	31·50	38·50
No.....	50	100	150	200	250	300

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₱ doz. $9·50
Clipper No. 10, Bright Blade Boxed and Sharpened.....₱ doz. $9·00
Clipper No. 5, Painted Red, Boxed and Sharpened.....₱ doz $8·50
Cast Steel Scythes.....$7·50 to 8·00
German " .....6·50 @ 7·00

Squares.—Steel and Iron, new list.....dis 50 %

Saws.—Disston's Cross Cut, No. 1.....per ft., 55c
Disston's Cross Cut No. 2.....per ft., 50c
Disston's Cross Cut, Patent.....per ft., 50c
W. McNiece & Bro's, Cross-Cut & Circ'r, new list..dis 15 %
Boynton's Lightning, new list.....dis 50 %
Boynton Champion.....dis 45 %
Boynton One-Man Cross Cut Saws.....dis 40&10 %
Boynton Billet Webs (no Frame).....$6·00

Shovels and Spades.
Rowland's Plain Back.....dis 47½ %
" Back Strap.....dis 40&5 %
Extra discount on above for 10 days' cash, 5 %.
Oliver Ames & Sons.....dis 25 %

Sad Irons.—Richmond (polished face).....per lb. 3½c
Richmond (polished face)..... by the cask " 3

Stone.—Arkansas Oil, No. 1.....₱ ℔ $
Turkey Oil, No. 1..... "
Washita Extra.....net " 35c
" No. 1.....net " 30c
" " 2.....net " 25c
Hindostan 8 inch..... " 5c

Screws.
United States and others in Combination...dis 52½ %
Keystone, not in Combination.....dis 52½&5 %

Spoons.—
Plated.....dis 40 @ 40&5 %
Britannia, Boardmans (new list).....dis 50&10 %
" Parkers (old list).....dis 50 @ 50&10 %
German Silver.....dis 30 %
" Light.....new list dis 35 %
Lalance & Grosjean Iron.....dis 70 %

Springs.—Gray's Door.....dis 60&10 %
Torry's Door.....dis 60&10%

Stocks and Dies.
Stove Polish.—Gem.....dis 10&5 %
Onyx.....₱ gross, $3·00
" $5·00

Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %

Tacks, &c.—Half Weight Tacks.....dis 75 @ 75&10 %
" " by the case...dis 72½&7½ %
Trunk, Clout and Finishing Nails.....net to 10 %
" " by the case.....dis 7½ %

Traps.—Genuine Oneida—Newhouse list.....dis 20&25 %
Im. Oneida—Newhouse list (1st qual.)..dis 40 @ 40&5 %

Vises.—Solid Box, currency.....₱ ℔ 13½c

Wrenches.—Coes Genuine.....dis 40&5 @ 40&10 %
Coes Imitation Wrought Bar.....dis 50&50&10 %
" Malleable Bar.....dis 60&10 %
" (Kellogg) Malleable Bar.....dis 65&10 %
Tafts Pattern (Wrought Bar).....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " Improved Baxter.....dis 25 %
" " Adjustable Fork.....dis 25 %

Wire.—No. 0 to 18.....(Advanced April 24th).....dis 50 %
No. 19 to 26..... " " .....dis 55 %
No. 27 to 36..... " " .....dis 55 %
Coppered 0 to 12.....dis 52½ %
Tinned Broom Wire.....dis 15 @ 20 %
Galvanized Wire No. 1 to 18.....dis 35 %
" " 19 to 24.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
Aug. 1st, 1876.

Augers—Snell Mfg. Co.....dis 25 %
Axes—Francis.....
Bits, Auger—Snell Mfg. Co.....10 25
Phœnix.....dis 25 %
Bells, Cow—Law's Genuine.....dis 40 %
Braces—Bit, Spofford's Patent.....dis 25 %
Brads, Cut.....dis 50 %
Brass—Sheets.....dis 50&10 %
Boards—Stove, Brooks' Pat..dis 35 % 4 mos.; 35&5 % 30 dys
Bolts—Stove.....list net
Brick—Bath (box of 2 doz) Best English.....dis 35 %
Can Openers—Sprague's.....$1·25
Cases—Parlor Coal Hod.....dis 55&10 %
Chalk—White, Carpenter's.....dis 15 %
Red, Carpenter's.....₱ gross, 57c
Chisels—Firmer Socket.....90c
Framing Socket.....dis 70 %
Corner Socket Chisels.....dis 70 %
Slick's Carpenters'.....dis 70 %
Castings—Malleable.....dis 70 %
Cocks—Globe and Bibb.....₱ ℔ 9c
Cutters—Meat, "Hales".....dis 40 %
Egg Beaters—"Dover".....dis 40 %
Elbows—Corrugated.....per doz $4·00
Adjustable, Springfield.....dis 15 %
Flies—Maischoss Bros.....dis 20 %
Fluters—Geneva Hand.....dis 50&10 %
Freezers, Ice Cream—"Champion".....₱ doz. $15·00
Im. Oneida—Newhouse list (1st qual.)..dis 40 @ 40&5 %
Hammers—Henry W. Kip's.....dis 33⅓ %
Hinges, Gate—Shepard's.....dis 10&5 %
Hinges—Window Blind—Shepard's and Standard.....dis 30&10 %
Hods, Coal—Plain, Black and Galvan'd...new list dis 15 %
Fancy and Helmet..... " dis 15 %
Sad Irons..... " dis 15 %
Kettles—Brass.....31½c
Copper, "Hand Made".....₱ ℔ 45c
Enameled.....40c.
Knives, Drawing—Oval No. 1.....dis 50 %
Razor Blade.....dis 70 %
Lanterns, Tubular—with guard.....dis 60&10 %
Without guard.....$10·50
Machines—Apple Paring.....10·00
Machines—Boring, Snell's.....7·50 ₱ doz
Mills, Coffee—Box and Side, common.....dis 25 %
Box Union and Eagle.....dis 20 %
Cut Nails, "Harrisburg," 10d.....dis 20 %
Horse, Ausable.....No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " Pointed & Polished.....add 1c ₱ ℔
" " 1000 lbs.....
Paint—White Lead, U. S. Gov't.....dis 5 %
Pans—Dripping.....₱ ℔ 8½c
Frying.....₱ ℔ 9c
Rivets—Iron, Black and Tinned.....dis 40 %
Screws—"American screw Co"—Flat Head, Iron.....dis 55 %
Flat Head, Brass.....dis 55 %
Sieves—Wood, Hoop iron.....dis 55 %
Tinned.....$1·35
Sifters—Ash.....1 75
Skates and Straps—White's.....$10·00 @ $12·00
Spoons, Iron Tinned.....dis 30 %
" by the case.....dis 10 %
S. S. & Co., Kitchen.....dis 20 %
Plated Rogers' A No. 1.....20&10 %
Britannia.....dis 40 %
G. S. Hall, Elton & Co.....dis 50&5 %
Scales—Buffalo Scale Works.....dis 30 %
Fairbanks.....dis 25 %
Stove Polish—Gem.....dis 15 %
" Dixon's.....₱ gross, $4·50
Palace.....₱ gross, $3·75; bulk, per ℔.. 10c
Squeezers—Lemon, Porcelain.....6·00
Tacks—Half Weight Am. Iron.....₱ doz., $3·40
Tea Trays.....dis 35&10 %
Thermometers—Tin Case.....dis. 15 %
Tools—Tinmens'.....dis 50&10 %
Vises—Palace Coal.....dis 10 %
Vises—Parallel, Buffalo...Old pattern, dis. 30 %; new, do.dis 20 %
Ware—French, Tinned and Iron.....dis 20&10 %
Stamped and Japanned.....dis 15 %
Cast Iron Hollow.....dis 45 %
Wire—Brass and Copper.....list net
Wire—Bessemer Steel.....dis 10 %
Wringers—Novelty.....$72 00; lots of 2 doz., $70·00
Tin Plates.—Add for each X.....2·50
10x14, IC. Charcoal... ₱ 225 | 14x20 C. terne.....$8·25
12x12, " " 9·25 | 20x28 C. " 17 00
12½x17, " " 8·25 | 20x28 X. " .....22·00
14x20, " " 9·75 |
Pig Tin—Straits.....22c @ 23c
Bar Tin.....
Solder—No. 1, Crook's.....24c
No. 1 Star.....16 c
Sheet Zinc—"Lasalle".....570 ₱ 100 ℔ casks
$9·50 $9·50 ₱ 100 lbs
Sheets.....
Babbitt Metal.....$9·50
Iron Wire—Bright and Annealed.....₱ ₱ 12c
Coppered.....dis 45 %
Tinned.....dis 40 %
Tinned Broom, { Nos. 20 21 22 } .....dis 40 %
{ 20c 21c 21c }
Copper—Sheathing 14 @ 18 oz.....₱ ℔ 31c
Planished.....₱ ℔ 37c @ 39c
Bottoms.....₱ ℔ 33c
Bolts.....
Braziers' Sheets.....₱ ℔ 32 @ 34c
Sheet Iron.—18 Common.....$3 80
24 Common.....4 00
26 Common.....4·20
24 W. D. Wood & Co., Smooth Finish.....4 75
Planished..... A. B.
Gen. Russia, No. 1 stained..... 13c 11c
" " clean.....13½c
Galvanized.....dis 30 %

DETROIT.

(Reported by Messrs. Jewett & Root.)
Aug. 9, 1876.

Tin Plate.—Best Charcoal

IC. 10x14	$ 8 75
IX. 10x14	11 25
XX. 10x14	13 75
IC. 12x12	9 25
IX. 12x12	11 75
IC. 14x20	9 75
IX. 14x20	12 25
XX. 14x20	14 75
XXX. 14x20	17 25
DC. 100 Plate	8 25
DX. "	10 75
DXX. "	13 25
DXXX "	15 75
DXXXX 100 Plate	18 25
IX. 14x14	17 75
IC. 10x14 W	8 25
IX. 10x14 W	10 75

Roofing Tin.—Best Charc.

IC. Terne, 14x20	$ 8 25
IX. " 14x20	10 75
IC. Terne, 20x28	17 50
IX. " 20x28	22 50

Coke Tin.—

IC. 10x14 Coke	$ 8 50
IX. 10x14 Coke	11 00
IC. 14x20 "	10 00

Solder.—No. 1..... 18c
No. 2..... 16c

Pig Tin.—

Large Pigs	24c
Small Pigs	25c
Bars	26c

Bright Wire.
63 lbs. in bdl.....dis —

Copper.—

Sheathing	38c
Copper Bottoms	34c

Planished Copper.—

Sheathing, 14x48	41c
Boiler Size, No. 7	42c
" " No. 8	42c
" " No. 9	42c

Sheet Iron.—

No. 18 Am. Com	4 00
No. 24 Am. Com	4 20
No. 26 Am. Com	4 40
No. 27, Am. Com	4 60

W. D. WOOD'S & CO.'S SHEET IRON.—

Nos. 15 to 20 Smooth	$5 00
" 21 to 24	5 20
" 25 & 26	5 40
" 21 to 24 Charl.	6 70
" 25 & 26 "	6 90

RUSSIA.

Genuine	17c
Imitation	14c

PITTSBURGH.

The following are the Card rates, f. o. b. in Pittsburgh of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St. New York, Agent.

Iron, standard list assorted sizes, for large orders, specifications to include Bands, small Rounds and Ovals, 3·5c, rate, 2 % off net.
Merchant Bar Iron, as per terms named above.
Flat Rail (1¼x¼), punched and coun'sunk.....4c ₱ ℔ net
Iron Wedges.....4c ₱ ℔ net
Norway Nail Rods.....8½c ₱ ℔ net
Iron Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....4½c ₱ ℔ net
Beetle Rings.....6 c ₱ ℔ net
Fence Pickets—
⅝ round, bent to shape, 25c ₱ ft. of fence, less 15 % off.
Discount off Standard List.
Carriage and Tire Bolts, 75 % off net.
Stove Bolts.....50 % off net
Elevator Bolts.....25 % off net
Machine and Square Head Bolts.....new list 50 % off net
Coach and Lag Screws..... " 50 % off net
Bolt Ends..... " 50 % off net
Pat. Hot Pressed Sq. and Hex. Nuts.. " 7c ₱ ℔ off net
Washers, all made from new band iron " 7c ₱ ℔ off net
Nuts and Washers in 25 lb. boxes, ½c ₱ ℔ ex. Nuts and Washers in lots less than one keg each size, ½c ₱ ℔ ex. Nuts and Washers in 5 lb. boxes, 1c. ₱ ℔ ex, net prices.
Standard Caps, for Plows.....5c. ₱ ℔ net
Iron Harrow Teeth, in lots of 3 tons or more, packed in 200 lb. boxes, 1 in. diam. 3c ₱ ℔ net; ⅞ in. diam. 3c ₱ ℔ net; ¾ in. diam. 3½c ₱ ℔ net.
Pat. Headed Harrow Teeth, packed in boxes ½c ₱ ℔ ex.
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5c ₱ ℔ net; 9-16 in. diam. 6c ₱ ℔ net; ½ in. diam. 7c ₱ ℔ net. 1c ₱ ℔ extra when less than 1 keg of each size is ordered.
Screw Hook and Eye Hinges, ⅜ to 1 in. diam., 8c ₱ ℔ net; ⅝ in. diam., 9c ₱ ℔ net; ½ in. diam., 11c ₱ ℔ net.
Strap & T Hinges.....50, 10&5 % off list
Screw Hitching Rings, light, with ¼ ring, No. 1, $4·25 ₱ 100 net; heavy, with 5-16 ring, No. 2, $4·75 ₱ 100 net.
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₱ ℔ 3½c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 3¾c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long..... " 4¾c net
⅝, ¾ and ⅞ in. diam. from 1¼ to 4 ft. long " 4¾c net
Bridge bolts with upset ends..... ½c. ₱ ℔ extra
Wrought iron plates, punched.....4½c. ₱ ℔ net
Cast Iron Washers.....₱ ℔ 3½c net
Duck Nest Tuyere Irons.....$13 50 ₱ doz net

WAGON HARDWARE.—Standard List.

Single Tree Iron, Wt. Hook, Malleable Ferrule..₱ ℔ 19c
" " " and Clip..... ₱ ℔ 25c
Single and Double Tree Iron, Wrought Centre Clip, ⅝ in. Welded, with ¾ in. Ring.....₱ ℔ 15c
Neck Yoke End Ferrule, Malleable, with Wt. Iron Ring.....₱ ℔ 19c
Neck Yoke Attachment, with plates complete..₱ ℔ 15c
25 per cent. off Single and Double Tree Irons, Neck Yoke End Ferrules and Neck Yoke Attachments, for orders of 50 set, and 10 per cent. additional off for quantity orders, same as other Wagon Hardware, as noted below.
Plow Single Tree, Ironed complete, Irons all Wrought.....each, 55c
Wagon Single Tree, Ironed complete, Irons all Wrought, except Malleable Ferrule.....each, 65c
Wagon Single Tree, Iron complete, Irons all Wrought; Improved End Pieces riveted on; one side acts as a wear iron for wheel to rub against.....each, 65c
Neck Yoke, Ironed complete, Iron all Wrought, except End Ferrules, with Wt. Iron Rings....each, 75c
Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₱ set of 8 bolts.. 45c
12 " ½ " " 8 " .. 55c
10 " 9-16 " " 8 " .. 65c
12 " 9-16 " " 8 " .. 70c
14 " 9-16 " " 8 " .. 80c
10 " ⅝ " " 8 " .. 80c
12 " ⅝ " " 8 " .. 90c
14 " ⅝ " " 8 " .. 90c
16 " ⅝ " " 8 " .. 1 00
18 " ⅝ " " 8 " .. 1 10
20 " ⅝ " " 8 " .. 1 20
5c ₱ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....15c
" " wide track, each.....17c
Single Tree Irons, ₱ set of four pieces.....30c
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....45c
" " 3 " " " 50c
" " 3½ " " " 55c
Wagon Brake Ratchets, each.....10c
" " " finished with guard, each..14 c
Wrought Hammer Straps, heavy pattern, each..13 c
" " light " each..12 c
" Rub Irons, each..... 9 c
Stay Chain Hooks, each..... 5½c
Double and Single Tree Clips, figure 1, each..... 8 c
" " " 2, each..... 9 c
" " " 3, each..... 11 c
Pole Caps, each.....20c
Single Tree Hooks, Nos. 1 and 2.....45c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks, Clips, Single Tree Hooks, and Pole Caps, in lots of 50 sets.....dis 25 %
For each order amounting to $200 net, or over, for the following goods: Wagon Hardware, Carriage and Tire Bolts, Rivets, Skein Bolts, Nuts, Washers, Bevel Box and Tongue Cap Iron, we will allow an extra discount of 10 per cent on all Wagon Hardware, subject to discount, comprised in the order.
Axle Tree Clips, No. 1.....each 3½c net
" " No. 2..... " 3½c net
" " For Farm and Lumber Wagons.
Shank, 9-16 in., flat part 1¼ in.....each, 7½c net
Plow and Wagon Clevises..... ₱ ℔ 8c net
California Tire Rivets and Burrs, 5-16..... " 10c net
" " " ⅜ " " 11c net
Wagon Box Staples, 1½ to 2½ in. to clinch. ₱ 1000 $10·75 net
" " Bevel Box Iron, to rivet on. ₱ 1000 7·25 net
Neck Yoke Eyes, each.....4½c net
" " with ⅝ rings, each.....7c net
King Bolts, ¾, 1, 1¼, and 1½ in. diam.....₱ ℔ 3½c net
Wagon Rivets, ex. large flat, oval and steeple head, ¼ in. diam., 1 in. and longer..... " 7½c net
Wagon Rivets, 3-16 in. diam., 1 in. and longer " 8½c net
" " ¾ to 1 inch long..... ₱ ℔ 1c extra
" " & Nails, in 5 ℔ paper boxes..... " 1c extra
" " in 25 ℔ wood " " ½c extra
Wagon and Hinge Nails, pointed by hand—
¼x5 and longer. 2½ & 2¾ 2 & 2½ 1¾ and shorter. 11c ₱ ℔.
3-16x3 and longer. 2½ & 2¾ 2 & 2½ 1¾ and shorter. 12c ₱ ℔. 14c ₱ ℔. 16c ₱ ℔. 18c ₱ ℔ net
Wagon Rivets and Nails, in less lots than one keg each size..... " ½c extra
Double Tree Plates..... " 7½c net
Coupling " ..... " 4½c net
Tongue " ..... " 8½c net
Neck Yoke Plates..... " 9½c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₱ ℔ as No. 12 Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in. ₱ ℔ 9c net; ¼ in., 10c net.

Our prices are all subject to change of market, without notice.

N. Y. MALLET and HANDLE WORKS
Keep constantly on hand
Calkers', Carpenters', Stone Cutters', Tin, Copper and Boiler Makers'
MALLETS.

Hawsing Beetles, Hawsing and Calking Irons; also all kinds of Handles, Sledge, Chisel and Hammer Handles.
Also, all kinds of Wood Turning, File Handles, Cotton Hook Handles, Druggists' Boxes. All work turned out by the Waymouth Improved Patent Variety Wood Turning Lathes.
456 E. Houston St., N. Y.

BELCHER BROS. & CO.
Rule Manufacturers.
Rules and Scales, Tape Measures, Joiners' Tools, Machinists' Tools, Surveyors Chains, &c. Address
WM. H. BELCHER, 89 Chambers St., N. Y.
Price List mailed on application.

SPEAKING TUBES,
Etc.
C. A. FREDERICKS
83 Fulton Street, New York.
PATENT ALARM WHISTLES.

LOUIS RAISER,
Successor to GEORGE REUTHER,
Machinist, Model and Lathe Maker.
125 & 127 Worth Street, NEW YORK
Bet. Centre & Elm Sts. (Saw Mills)
Residence, 214 Canal St.

LATHE
FOR SALE CHEAP.
12 ft. bed, 38 inch swing by 9 ft.
Guy C. Hotchkiss, Field & Co.
85 First St., Brooklyn, E. D., and New York City.

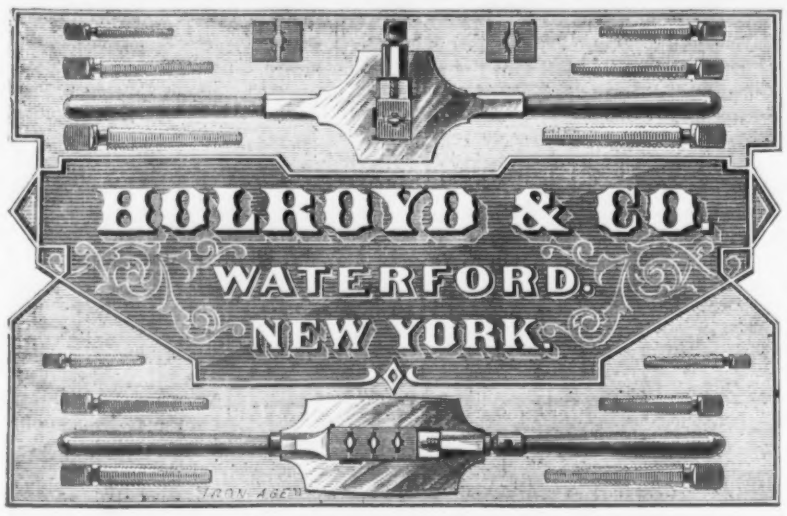
FOR MELTING ALL KINDS OF METALS,
And Manufacturers of
Sunny Side Stove Polish.
Lumber Pencils, Foundry Facings and Lubricating Plumbago.
STROW, WILE & CO.,
Nos. 1324, 1326, 1328, 1330, 1332 & 1334 Callowhill St., Phila.
GENERAL AGENTS:
Messrs. HALL & CARPENTER, 709 Market St., Phila.

I am now prepared to furnish as a specialty MAIN OR DRIVING BELTS of any width, single or double, manufactured especially for the work to be performed, at VERY CLOSE FIGURES.
DRIVING BELTS.
Send for prices stating dimensions and *Speed* of engine and pulleys, with full particulars as to work, Etc.
CHARLES W. ARNY, Manufacturer,
148 North Third Street, PHILADELPHIA, PA.

WM. F. FOREPAUGH, Jr., & BROTHERS,
TANNERS.
Also, Manufacturers of Superior Oak Tanned
LEATHER BELTING.
N. W. Cor. Randolph and Jefferson Sts., PHILADELPHIA.
All Belts warranted. Orders by Post immediately attended to.

CHAMPION BARROWS.

WITH WOOD OR IRON WHEELS.
A first-class article and a specialty, that will make a demand in any market and afford a good margin for dealers. We are prepared to furnish them in large quantities. Manufactured by
BRYAN MANUFACTURING CO., Bryan, O.
SEMPLE, BIRGE & CO., Sole Western Agents, ST. LOUIS, MO.



The National Steel Tube Cleaner.

Patented July 28, 1874.

Guaranteed to clean better, last longer and work easier than any in the market. Removes all Carbon and Scale from the Boiler Tubes. Adopted and in use by United States Navy. For sale by dealers.

THE CHALMERS SPENCE CO., Foot East 9th St., N. Y., Agents for the United States.

C. SCOFIELD'S STRAIGHTENER OR BENDER,

For Shafting, Axles Tubes, Rails, &c.

There has long been a want of some device by which the straightening of shafting could be done without removing the work from the centers, and at the same time do it quickly and accurately. The

SCOFIELD PATENT SHAFT STRAIGHTENER

meets just such a want; the apparatus is light and can be easily handled, yet it is of sufficient strength for the purpose required. It can be placed upon the shears of the lathe, and moved along the entire length of the work. It is especially

Adapted to Removing Short Bends,

which frequently occur in long lengths of shafting. The lightness of the Straightener renders it eminently

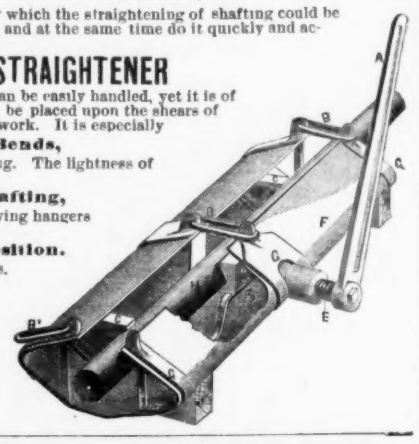
Adapted for Line and Counter-Shafting,

without necessitating the time and trouble of removing hangers and detaching couplings, but can be

Easily applied to the Shaft while in Position.

It can also be used on the bench for short lengths.

For Circulars, Price List, &c., Address,

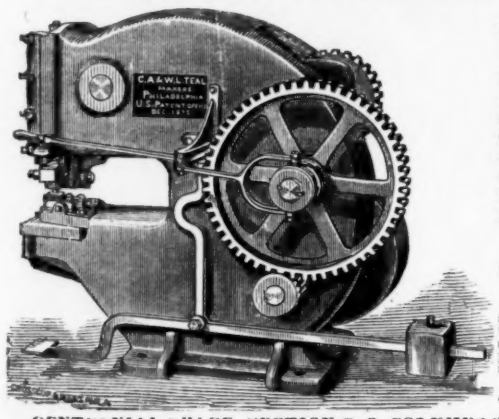


C. SCOFIELD & CO.,

Vineland, N. J.

C. A. & W. L. TEAL,

Manufacturers of IMPROVED BENDING ROLLS



Arranged for **Removing Work from the end of top roll.**

COMBINED

Punching and Shearing Machines, Single Power Punching Machines with Shearing Attachments, **Rotary Shearing Machines, Steam Riveting Machines. "Atherton's" Patent "Cam," Steam Engines, Hair Picking Machines and**

MACHINERY

in general.

We would call special attention to the above engine, as it has the same leverage on the driving shaft at every point of the stroke that the "crank" has at its strongest point, making a smoother running as well as a more powerful engine.

4116 Ludlow St., Philadelphia.

CENTENNIAL SPACE, SECTION C. 3, COLUMNS 25 & 26, MACHINERY HALL.

Morse Twist Drill and Machine Co.,

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,

Beach's Patent Self-Centering Chuck, Solid and Shell Reamers.

BIT STOCK DRILLS,

Drills for Coes, Worcester, Hunter and other Hand Drill Presses. Beach's Patent Self-Centering Chucks, Center and Adjustable Drill Chucks, Solid and Shell Reamers. Drill Grinding Machines. Taper Reamers, Milling Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.

C. RIESSNER & CO.,

MANUFACTURERS,

No. 242 Pearl Street, NEW YORK

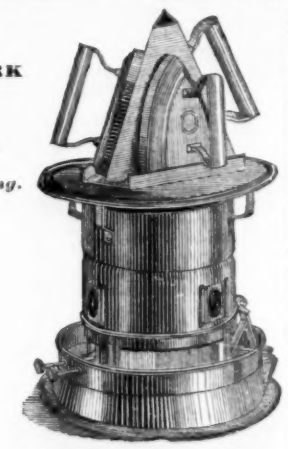
"SUMMER QUEEN"

Oil Cook Stove.

FOUR SIZES.

Suitable for all purposes, for Cooking, Baking and Ironing.

NON-EXPLOSIVE.



We beg to announce to the trade that our **NEW CENTENNIAL GAS STOVE** is now ready, and feel no hesitation in claiming it to be the most Perfect and Economical Stove in the market.

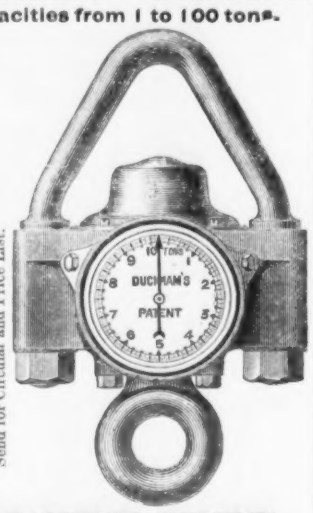
THE "DUCKHAM" PATENT

Suspended Self-Indicating

WEIGHING MACHINE.

Capacities from 1 to 100 tons.

This machine is used on a crane or any lifting apparatus, and indicates the weight on the dial directly the article is lifted. It is accurate, requires no adjusting, portable, and the greatest labor-saving weigher ever introduced. Send for Circular and Price List.



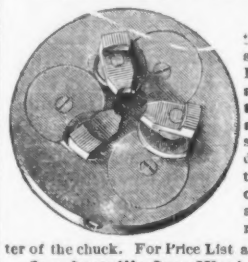
ROBERT KING,

MANUFACTURER,

Hydraulic Presses, Accumulators, &c.

246 to 250 Plymouth St., Brooklyn, N. Y.

JOHNSON'S PATENT UNIVERSAL LATHE CHUCK.



We invite attention to the superior construction of this chuck. Its working parts are **absolutely protected from dirt and chips.** It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address.

Lambertville Iron Works, Lambertville, N. J.

RIEHLE BROTHERS,

Office and Works, N. 9th St., above Master, Phila.
Warerooms, 50 & 52 S. 4th St., above Chestnut, Phila.
New York Store, 93 Liberty Street,
Pittsburgh Store, 43 Smithfield Street.

SCALES

SCALE AND TESTING MACHINE WORKS

PHILADA ESTABLISHED 1848

"Patented" Furnace Charging Scale.

Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

Send for Illustrated Price List.

BUFFALO

Bellows Factory and Planing Mill.

ESTABLISHED 1852.

JOSEPH CHURCHYARD,

Contractor, Builder

AND

Manufacturer,

CLINTON, cor. ADAMS STS.,

Buffalo, N. Y.

SASH, BLINDS DOORS,

Cisterns, Tanks, Stairs, Hand Rails, Newels, Mirror Frames, Mantels, Curtain Cornices, Book Cases, Veneered Doors, Mouldings, and complete interior and exterior finish for houses.

ROUGH AND PLANED LUMBER,

Flooring, Siding, Shingles, Lath and Fence Posts.

Blacksmiths' & Moulders' Bellows.

J. CLARK WILSON & CO., Agents, 81 Beekman Street, N. Y.

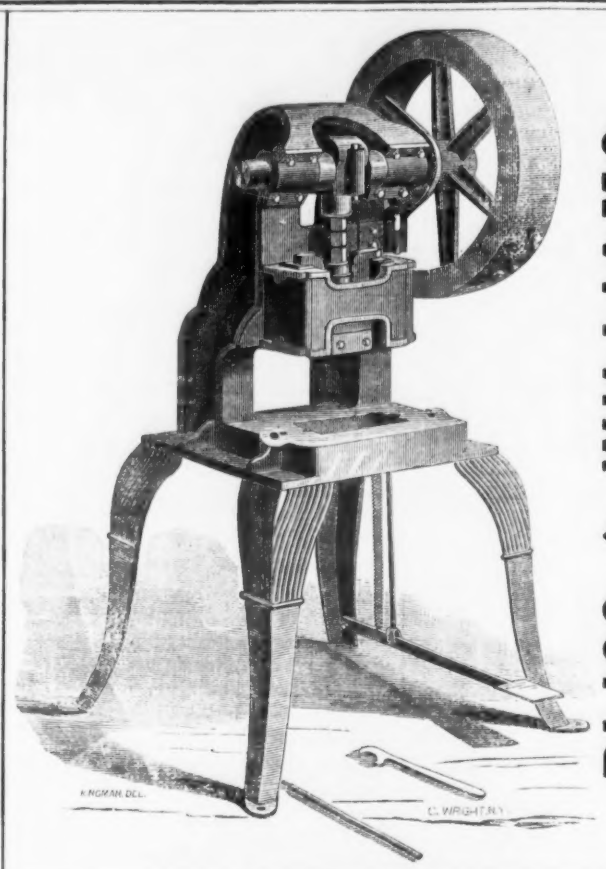
586 Water St., N. Y.

Manufacturers of

NEWCOMB BROS.,

Standard Bellows.

SCOTT'S



BLISS & WILLIAMS,

Manufacturers of all Kinds of

PRESSES, DIES, & SPECIAL MACHINES,

FOR WORKING SHEET METALS, &c.

167 to 173 Plymouth Street, Cor. of Jay, Brooklyn, N. Y.

AMERICAN

Meat & Vegetable Choppers

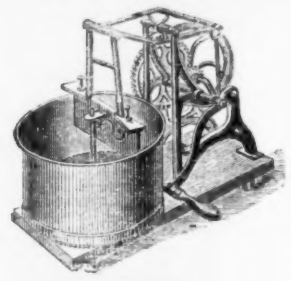
FOR THE USE OF

Families, Boarding Houses, Restaurants, Hotels and Butchers.

MORE THAN 60,000 NOW IN USE.

They are sold in every State in the Union, and in many foreign countries.

They will do MORE work and require LESS power than any Chopper ever invented.



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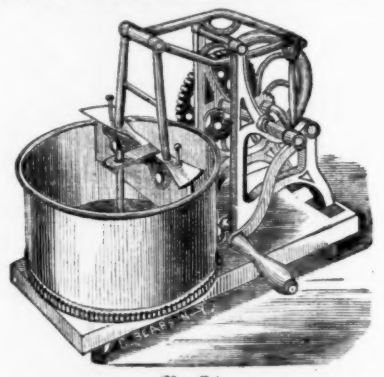
No. 1, Small Family Size..... $ 5 00
" 1½, Large " " 7 50
" 2½, Hotel or Bakers' Size..... 10 00



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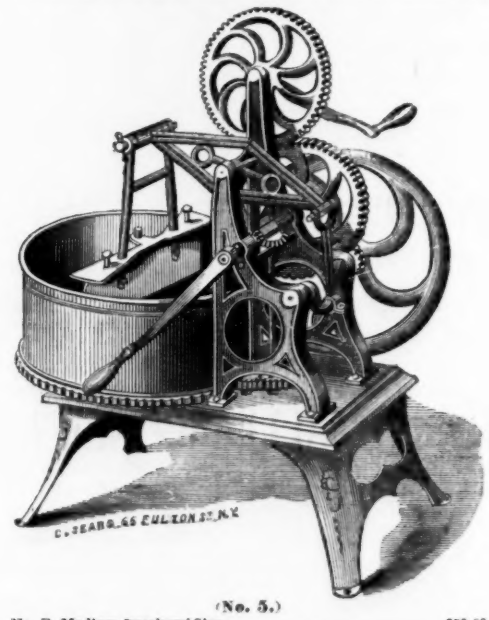
No. 3, "Farmers' Sausage Cutter"..... $12 00
" 4, Small Butchers' Size..... 25 00



(No. 5.)

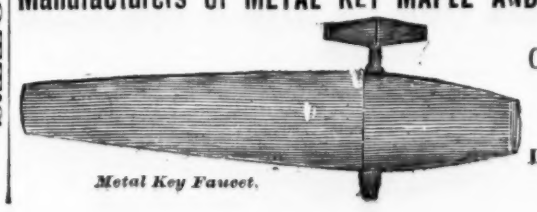
No. 5, Medium Butchers' Size..... $30 00
" 5, Large " " 60 00

Send for Circular.

BAILEY WRINGING MACHINE CO., Sole Agents, 99 Chambers St., N. Y.

MALTBY, CURTISS & CO.,

Manufacturers of METAL KEY MAPLE AND ROSEWOOD FAUCETS.



Metal Key Faucet.

Also Manufacturers of

Capewell's Giant Nail Puller.

The Buell Peg Float

AND THE

Little Giant Tack Puller.

34 READE ST., N. Y.

OLIVER'S CHILLED PLOWS.

These implements, though but four years before the public in their present form, show the following remarkable record:

1506 were sold in the season of **1871.** **7472** were sold in the season of **1873.** **31,077** were sold in the season of **1875.**
3049 " " " **1872.** **14,976** " " " **1874.** **42,139** having been sold the past spring.

The sales for 1876, will undoubtedly exceed 60,000 Plows. For full descriptive circulars, address,

SOUTH BEND IRON WORKS, South Bend, Ind.

IMPROVED DERINGER REVOLVERS.

No. 1, 22 Calibre; No. 2, 32 Calibre, Long Cartridge.

Cut Represents No. 2, 32 Calibre, 5 Shot. Size reduced one-third.

Exact Model of S. & W. No. 1 and No. 1 1-2 Revolvers.

These Arms are Half Nickel Plated and are equal in style of finish to the best Arms in the country. Quality of workmanship and material first-class; warranted. Price less than any other Hinge Barrel Cartridge Revolver of same quality in the market.

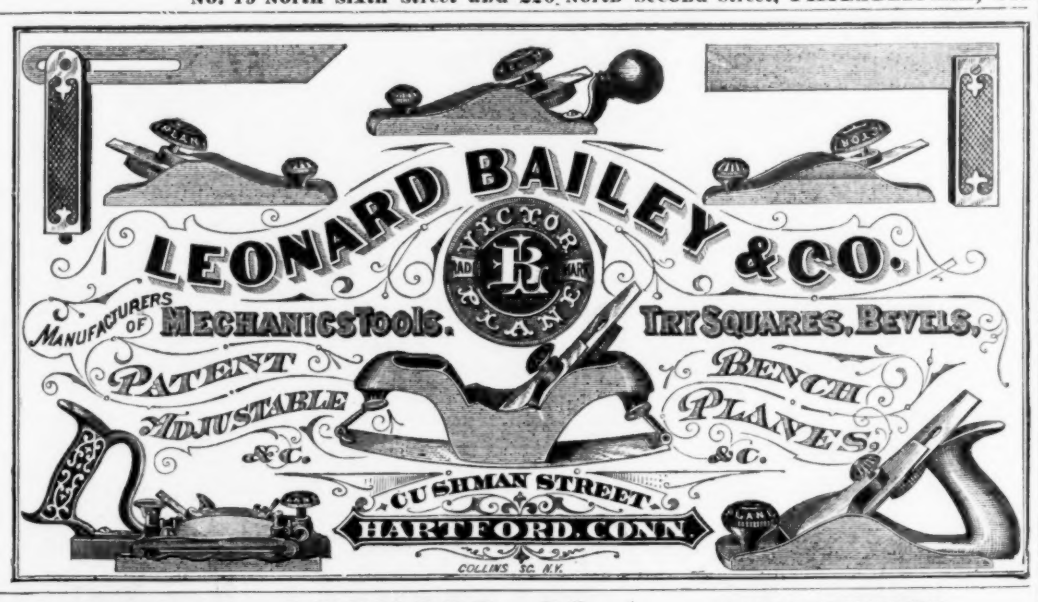
SOLE AGENTS:

EDW. K. TRYON, Jr., & CO., Dealers in FIRE ARMS,

No. 19 North Sixth Street and 220 North Second Street, PHILADELPHIA, PA.

THE VICTOR PLANES

Are the most simple, compact and practical Adjustable Planes ever offered to the public. They are made under the personal supervision of Mr. L. Bailey, the original inventor of L. Bailey's Patent Adjustable Iron Planes. All our Planes have our Trade Mark. Send for Catalogue, embracing Planes, Try Squares, Bevels, Rules, Levels, Hammers, Mitre Boxes, etc., etc.



THE BILLINGS & SPENCER CO.,

HARTFORD, CONN.

MANUFACTURERS OF

Die Plates and Dies, Genuine Packer Ratchet Drills, Clamp, Die and Common Lathe Dogs, Barwick Wrench and Pipe Tongs, the Billings Patent Sewing Machine Shuttles, Marlin Spikes, Calkers' Tools, Clinch Rings, Saw Sets, Screw Drivers,

And all description of IRON AND STEEL

Drop Forgings.

Send for a Circular.

HAMMER & CO.,

Branford, Conn.,

Manufacturers of the following *Patented* Articles of

MALLEABLE IRON:

Hammer's Adjustable Clamps.
Hammer's Malleable Iron Oilers.
Hammer's Mall. Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.

For Sale by all the principal Hardware Dealers.

Malleable Iron Castings

Of superior Quality and Hardware Specialties in Malleable Iron made to order.

GLOBE NAIL COMPANY,

MANUFACTURERS OF

Pointed, Polished & Finished Horse Shoe Nails.

Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

GLOBE NAIL CO., Boston, Mass.

Solder.—F. S. & Co.'s make

Best Fine	18c
No. 1	17c
Roofing	15c
Braziers or Spelter Solder	30 to 33c
Antimony	22c
Babbit Metal—F. S. & Co.'s	15
No. 2	14c

Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smoot) Juniata
No. 24	3¾c	5 c	6½c	8¾c
25 & 26	4 c	5¼c	6¾c	9 c
27	4¼c	5¾c	7 c	9¼c

Galvanized Iron dis 30 %

No. 16 to 20	12c	No. 27	15c
21 to 24	13c	28	16c
25 & 26	14c		

Russia Iron.—

Perfect	16c
No. 1 Stained	15c
In sheets, 1c. higher.	
A	13c
B	11c
In sheets, 1c higher	

Lead.—

Pig	7¾c
Bar	8¾c
Lead Pipe, in full coils	9 c
Lead Pipe, when cut	9½c
Sheet Lead	10c

Wire—Bright dis 40 %
Coppered dis 30 %

BOSTON.

(Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.)

Anvils.—"Eagle American" per lb. 10c; dis 20 %
Augers.—Watrous Ship dis 10 %
L'Hommedieu Ship dis 30 %
Axes.—Blue Jacket 10 00
Racer 9 00
Boy's Handled Blue Jacket 11 00
Axe Handles.—Wadleigh's Oak-
A (Extra) $2·50. B (No. 1) $2·00. C (No. 2) $1·50 ₱ doz
Blind Hinges.—
Orr or Washburn's per hundred sets $8 00
Blind Fasts.—
Orr or Washburn's per hundred set $6 00
Bolts.—Carriage. Phila. " Girard Works dis 60 %
Borax.—Best Refined ₱ lb 11c
Borers.—Angle. Backus' dis 50 %
Boring Machines.—Angle each $4 50
Common. Snell's quality each 3 50
Braces.—Barber's dis 40&5 %
Backus' dis 50 %
Spofford's dis 50 %
Brackets.—Star bronzed new list net
Star Japanned new list net
Store Shelf new list net
Brass Faucets.—L. F. & C. dis 25&10 %
Brushes.—Horse, Patent Metallic per doz. $4·50
Butts.—Union Drilled Loose Joint dis 45&10 %
" " Wire Fast Joint dis 25&10 %
" " Acorn Loose Joint dis 45&10 %
Brass Butts dis 30 %
Wrought Table Butts and Back Flaps revised list, dis 30 %
Wrought Narrow Butts reduced, dis 30 %
Cards.—
Curry Cards, No. X, per doz., $0·55 dis 30 %
Horse " No. X, " 0·80 dis 30 %
Wool " No. 8X, " 2·50 dis 15 %
Cotton " No. 10, " 3·50 dis 10 %
Cartridges.—U. S. Cartridge Co. dis 60 %
Chisels.—"Buck Bros." Shank Goods add 20 %
Socket add 25 %
Churns.—Lightning—
Redheffer patent 3 4 5 6 gall
per doz $22 00 $27 00 $31 50 $36 00
Compasses and Dividers.—Bemis' dis 40 %
P. S. & W. dis 30 %
Cordage.—Manilla (usual trade dis.) ₱ lb. 14c
American Tarred Hemp Lath Yarn ₱ lb. 10c
Corn Hooks per doz $2·75
Crow Bars.—Iron. Steel Points ₱ lb. 5½c
"Sweet" Steel Bars ₱ lb 11c
Brown's Steel Bars ₱ lb 10c
K. P. & Co. Extra Drill Steel ₱ lb 15c
Cow Ties dis 25
Dividers.—Cook's Nickel Plated dis 15 %
Door Springs.—Moseley—

Per doz	$9·00	12·00	15·00	18·00	24·00
No.	0	1	2	3	4

Torrey's $2·50
Gem dis 10 %
Egg Heaters.—Lightning, Redheffer pat., pints, $5 50; 1 qt., $8 00; 2 qts., $12 00 per doz.
Emery.—Alden ₱ lb 5c
Wellington Mills ₱ lb 10c
Files.—
American $5 to £ currency, less 25 %
Nicholson new net list
Wheeler, Madden & Clemson $5 to £; 10 %
Stubb's Tapers, genuine, 3 in., $1·50; 3½, $1·62; 4, $1·88; 4½, $2·13; 5, $2·50
Funnel Irons. dis. 10 %

	$2·50	2·50	2·50	3·25 per doz
	5,	5½,	6,	7 inch.
Deep Flange.—$3·50	3·75	4·00		
	5,	5½,	6 inch.	

Hammers.—Maydole dis 12 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $9·75 " " " " " bell face, No. 1, $11; 1½, $9·75.
Hammond dis 12 %
Hangers & Rollers.—Novelty dis 30 %
Anti-Friction dis 40 %
Hatchets.—Underhill Edge Tool Co. dis 20 %
C. F. Dowse, warranted Cast Steel—
Shingling 0, $4·75; 1, $5·25; 2, $5·75
Claw 1, 5·75; 2, 6·25
Lathing 1, $5·50
Axe Pattern 1, $7·00; 2, 7·50
Broad 0, $5·75; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75
5, $12·75; 6 $14·75
Hinges.—Strap and T, Stanley Works dis 60 %
Plate, Loose and Fast Joint ₱ lb 6c
Wrought Screw Hook ₱ lb 6½c
Knobs.—Young's Imp. Silvered Glass dis 45 %
Lanterns.—Tubular No. 0 $ 9·50
Guarded. No. 74, (with kerosene oil and candle burners) 5·50
Anti-Tubular 8·00
Lead.—Sheet, 10c.; Pipe, 9½c. less 10 %
Locks.—Norwalk Lock Co. reduced list, dis 35&5 %
Mattocks.—
K. P. & Co., axe finish, long cutter $11 50—net
Short cutter 11 00—net
Meat Cutters.—"Miles's" Challenge dis. 30 %
No. 1, $22·00; 2, $30·00; 3, $40·00.
Metal.—Babbitt No. 1, 35c; 2, 25c; 5, 15c ₱ lb
Nails.—10d and larger $3 25 net
Nail Pullers.—Little Giant—Small per doz., $22·00
Little Giant—Large 30·00
Padlocks.—Wilcox reduced list, dis 35&5 %
Picks.—L. P. & Co., Solid Eyes 5 to 6 6 to 7
$9 00 $9 50
Pins.—Universal Hatand Coat all wood—
2 in. ₱ gross $2·50; 3 in., 3 5; 4 in., 4 50—dis 15 %
Plumb & Levels.—Stanley dis 60&10 %
Potato Diggers.
Wilmington, Cooley & Co. dis 30 %
Pulleys.—Axle.
Frame Pol. Wheel No. 150, 50c., 1¼ in.; 16, 38c., 2 in.
Common Axle No. 18, 34c., 1¼ in.; 26, 40c., 2 in.
Milled Axle No. 2, 42c., 1¾ in.; 2, 50c., 2 in.
Nashua Pat. Axle Bronzed Face 1¼ in., 80c; 2 in., 90c
Cast Steel Axle 2 in., $1·00
Pulley Blocks.—"Best Boston Make" net
Plated Ware.—Rogers Bros. dis 40 %
Pocket Knives.—Conn. Cutlery Co. new net list
American Shear Co. new net list
Rail Horn Door.—For Novelty and Anti-Friction Hangers per foot 7c. dis 40 %
Refrigerators—Heinz Patent dis 20 %
Rivets.—Black dis 50 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8, dis 35 %
13 13 14 14 15 16c ₱ lb
Sad Irons.—Bliss & Drake ₱ lb 8¾c
Sand Paper dis 15 & 5 %
M. B. & D. 0 to 2, $4·25; 2 to 3, $4·75
Saws.—*Hand and Panel*—
Wheeler, Madden & Clemson's, same list as "Disston's."
Disston's dis. 15&5 %
Wheeler, Madden & Clemson X Cuts per ft., 37c
" " " Champion X Cut. " 50c
Boynton's genuine Lightning X Cut per ft., 50c
Screws.—Am. Screw Co., new list Sept. 1st dis 52½ %
Scythe Stones.—
"Willoughby Lake," first quality ₱ gross $6·50
" " second quality " 3·00
Shovels.—O. Ames dis 25 %
M. B. & D. dis 25 %
Slicers.—Cast, Rice, &c. $12 00
Spading Forks.—W. C. & Co. dis 30 %
Stone Pickers.—"Partridge," original ₱ doz $15 00
Tools.—Aiken's Pattern, 50 in set; Parr's, 16 5/ per doz
Traps.—Oneida dis 25 %
Blake's dis 50 %
Vises.—K. P. & Co.'s Solid Box. Blacksmith ₱ lb 13c
Parker's Parallel dis 10 %
Backus dis 25 %
"Howards." Parallel dis 20 %
Wardrobe Hooks.—Wire to drive ₱ gross $1 00
Weather Strips.—"Harmon's" per doz $5, dis 10 %
Weights.—Window Weights ₱ lb 1½c
Wedges—Axe ₱ doz 35c
Wire.—
Eureka, in spools, No. 28 to 40 assorted ₱ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green. Drab or Black ₱ ft 5c
Wrenches.—Genuine Wrenches, G. A. Coes dis 40&5 %
Walton dis 50 %
Wringers.—

Novelty and Universal	Tub No. 2	Less than 2 doz	$90 00
		2 doz or more,	70 00
Bench A	less than 2 doz	$90 00	
	2 doz or more	88 00	
B	" "	98 00	
	" "	96 00	
C	" "	115 00	
	" "	111 00	
Eureka	" "	60 00	
	" "	58 00	

Withington, Cooley & Co.—
Hoes, Rakes, Forks, &c. dis 30 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers in Metals, No. 214, 216 and 218 Main street.

Aug. 21, 1876.

Tin Plate.—I. C. 10x14 Charcoal	@	$8·75
I. X. 10x14 Charcoal	@	10·25
I. X. 14x20 Charcoal	@	12·75
I. X. 14x20 Charcoal	@	15·25
I. C. 12x12 Charcoal	@	9·50
D. C. 12¼x17 Charcoal	@	9·25
D. X. 12¼x17 Charcoal	@	11·75
I. C. 14x20 Charcoal Roofing	@	7·75
I. C. 20x28 Charcoal Roofing	@	17·50
I. C. 14x20 Coke	@	7·50
I. C. 20x28 Coke	@	8·50
I. C. 10x20 Coke	@	13·00
Sheet Zinc.—Casks	@	9¼c
Sheet	@	10 c
Copper.—Braziers	@	32 c
Planished	@	40 c
Sheathing	@	32 c
Bottoms	@	34 c
Bar	@	32 c
Block Tin.—Pig	@	24 c
Bars	@	26 c
Lead.—Pig	@	7¼c
Bar	@	8¼c
Solder.—S. & Co	@	14 c
A 1	@	15 c
Market Wire.—Bundles		dis 40 %
Less		dis 35 %
Sheet Iron.—"B," No. 27		4·25c
Smooth, "S L U," No. 27		5·10c
Smooth D Refined, No. 27		6·80c
Planished "A"		13c
Planished "B"		11c
Imitation A		10 c
Imitation B		8¼c
Galvanized		dis 33⅓ %
Russia		15c
Brass.—Soft		30c
Hoop		35c
Platers'		50c
Tube		50c
Antimony		19c
Babbit Metal—No. 1	45c	
2	25c	
3	20c	
4	10c	
Bismuth		$3 50
Nickel		3 50
Steel Cast		14c
Elbows		dis 15 %
Sad Irons		3¼c
Enameled Ware		discount from new list 50 %
Bread Pans		₱ lb 8c

CHICAGO.

(Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.)

June 1, 1876.

Tin Plate.—			
10x14, IC, Ch'l. Good	$	14x20, IXX, Ch' Best	14 50
10x14, IC, " Best	8 50	14x20, IXXX, " "	17 00
10x14 IX, " "	11 00	DC, 100 Plate, " "	8 50
12x12, IC, " "	9 00	DX, " "	11 00
12x12, IX, " "	11 50	DXX, " "	13 50
14x20, IC, " "	9 50	DXXX " "	16 00
14x20, IX, " "	12 00	IX, 14x14 "	
14x20, IC, Charcoal Roofing, Com			
14x20, IC, " Good			
14x20, IC, " Best			8 00
14x20, IX, " "			10·50
20x28, IC, " Com			
20x28, IC, " Good			
20x28, IC, " Best			17 00
20x28, IX, " "			22 00
10x20, IC, Bright Coke for Gutters			13 00
Block Tin.—			
Large Pigs	24c	Bars	26c
Small	25c		
Zinc.—sheet, 500 to 1000 lb. Casks			9¼c
Loose Sheets			10½c
Slab Zinc or Spelter			¾ to 8c
Copper.—Bottoms			32c
Sheathing			30c
Planishes			36c
" Boiler lengths			38c
Bolt			35c
Braziers' Sheets.—			
30x60, 6 to 7 lbs.	₱ lb 32c	30x60, 10 to 12 lbs.	₱ lb 34c
30x60, 8 to 9 lbs.	" 34c	30x60, 15 to 100 lbs.	" 36c

Wrought Scrap Iron ₱ ton,
Old Rails

Steel.—	₱ lb.		₱ lb.
Eng. Tool, gold	15½c	Spring	7 c
American Tool	14 c	Tire	5¾c
" Mach	8½c	Sleigh Shoe	4½c
Bessemer	6½c	Toe Calk	8½c
Tin Plates.—₱ box gold		**Copper.**—	₱ lb
I. C. Char. 10x14	$7·50	Ingot	25½c
I. C. Coke 10x14	6·50	Bolt	30 c
Char. Roof. IC, 14x20,	7 00	Sheathing	32 c
Coke " IC, 14x20,	6 00	**Lead.**	₱ lb
METALS.		Pig	7½c
Pig Tin.—₱ lb., gold		Sheet	9c
Banca	23c	Pipe	8½c
Straits	17 c	**Zinc.**—Sheet,	₱ lb 10 c
English	17 c	**Spelter.**	₱ lb 8¼c
German	9 c	**Antimony,** gold	₱ lb 16 c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror ₱ doz. $7 75
Hudson's Rotary " 7 75
Axes.—Wm. Mann's, Red Warrior ₱ doz $9 75
" "C. Marshall" " 9 25
" Handled " $5 00
" Double Bitted " 10 00
H. L. B. & Co.'s, L. & Co. " 9 75
" Pioneer " 9 25
" James & Co. " 9 00
Hunt's " 12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles dis 15 & Common Axles (Pat. Lubricating), 1¼ inch and upward ₱ lb.
do. less than 1¼ inch 6½c.
Bellows.—Bes. St. Louis make 50c ₱ in. net
Bells.—Troy, Church, School and Farm Bells ₱ 2 40c
"Improved Amalgam Bronzed." 15 in., $2·00; 17 in., $2·50; 19 in., $4; 21 in., $5; 24 in., $14; 27 in. $19·50
Belting.—"Boston Belting Co.'s Rubber dis 40&5 %
Bradford & Sharp's" Oak-Tanned Leather dis 30 %
Bolts.—Metallic, Sectional, Bond's Pat. new list net
Bolts.—Arms, Bell & Co.'s Carriage & Tire dis 40&10 %
Arms, Bell & Co.'s Machine dis 40&10 %
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint dis 25&10 %
Broad Fast Joint dis 35&10 %
" Loose " dis 45&10 %
Reversible dis 40&10 %
" Japanned and Silver Tipped dis 45&10 %
Loose Joint "Acorn " " dis 45&10 %
Churns.—Julian, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50. dis 20 %
Cider Mills.
American Senior, $33·00; Am. Junior, $19·50 net
Corn Drill.—Campbell's Patent each $
Corn Knives.—Dunn Edge Tool Co.'s Clip ₱ doz 5 00
Seymour Mfg. Co.'s solid Steel Back " 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers dis 10 %
Hand Shellers Special rates
Cotton Gins.—
Carver, with 10 in. Saws, $4·50 a Saw dis 22½ %
12 in. Saws, $5·00 a Saw dis 15½ %
Crow Bars.—Steel Pointed ₱ lb 6½c
Drag Saw Machines.—
Culver's Iron Drag Saw dis 10 %
Robinson's Patent Sweepstakes Drag Saw dis 10 %
Fanning Mills.—Nash & Cutts dis 20 %
Feed Cutters.—Improved Burdick National dis 20 %
Sanford No. 1, $10 00; No. 2, $8 00. net
Files.—Black Diamond, Mill $5·00 £ currency.
" Bastard 5·00 £ currency.
" Taper 5·00 £ currency.
Forges.—Keystone Portable Forge Co.'s dis 12½ %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks dis 30 %
" Handled Hoes dis 30 %
Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe dis 15 %
" Planet Drill, Nos. 2 and 3 dis 15 %
" Combined Drill and Wheel Hoe dis 15 %
Grinding Mills.—Challenge Feed Mills dis 15 %
Sedgebeer's Nonpareil Mills dis 15 %
Bradford's French Burr Mills net list
Hammers.—Masons' Hammers ₱ lb 30c
Smiths' Hand 20 c
Handles.—No. 1 Fork, Hoe and Rake dis 25 %
No. 2 Fork, Hoe and Rake dis 30 %
Harrow Teeth.—1 inch iron ₱ lb 4½c.
⅞ and ¾ inch iron 4½
Barbed or Headed ½c extra
Hay and Cotton Presses.—
Dederick's Railroad net list
" Perpetual net list
Hay Knives.—
Dunn Edge Tool Co.'s ₱ doz $12 00 net.
Lightning (Weymouth's Patent) ₱ doz $9 00
Horse Hay Fork.—Nellis' Harpoon $8·50 each net
Horse Nails.—National Patent Pointed 30c rate
National Patent Pointed, extra finished 22c "
Horse Powers.—Pitts or Carey's Patent dis 10 %
Wheeler's Railway dis 10 %
Sandwich Lever dis 10 %
Horse Shoes.—
Rhode Island (Perkin's Pattern) ₱ keg, $5 50
" Mule " 5 50
" Trotting Shoes " 8 00
Tredegar Horse per keg 4 75
" Mule per keg 5 75
Hose.—
Boston Belting Co.'s Rubber Medium Sizes, dis 30&10 %
" " " Small Sizes, Hydraulic dis 40 %
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks ₱ doz $11 75 @ 18 50
" " Grub Hoes, oval eye " 8 25 @ 9 75
Money Drawers.—
Pierpont & Co.'s Excelsior per doz $88 00 net
Nails.—Wheeling Riverside Brand $3·65 rates
Packing.—Boston Belting Co.'s Rubber, Plain dis 30 %
Boston Belting Co.'s Rubber, Pure dis 25&5 %
" " No. 2 Plain dis 40 %
" " Round and Square dis 10&10 %
Picks.—
Railroad and Clay ₱ doz $8 50 @ 10
Coal " 7 45 @ 8
Pon " 11 00 @ 13 85
Stone " 13 40 @ 14
Tamping " 14 75 @ 15
Miners Drifting " 15 @ 11
Plows.—Avery's Cast and Steel dis 20 %
Collins Cast Cast Steel new list net
Pekin Steel dis 5 %
Plow Sulky.—Buckeye $30·00
Post Hole Augers.—Clark's Patent—
No. 1, ₱ doz. $27; No. 2, $30; No. 3, $32 dis 30 %
Pulleys.—5 inch per doz $3·70 net
4 inch per doz 2·50 net
Nellis' Patent dis 20 %
Pumps.—
St. Louis, Farm, Patent Metal Lined new list dis 25 %
Rakes.—Paddock's Premium Sulky each $27 50
St. Louis Revolving 14 tooth 4 50 net
" " 16 " 5 00 net
" Hand Hay Rake per doz $2·50
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives dis 40 %
" " sections dis 40 %
Road Scrapers.—Steel each $3·50 net
Cast Iron dis 10&5 %
Saws.—Curtis & Co. dis 12½ %
Scythes.—Dunn Edge Tool Co.'s dis 50 %
Scythe Stones.—No. 1 Ind'n Pond ₱ gr's, $7 00
Extra Indian Pond " 7 50
Premium " 10 50 dis 25 %
Diamond Grit " 13 00
Shovels and Spades.—H. M. Myers & Co. dis 30
Grain Scoops—Patent Cor'd Straps H. M. M. & Co dis 30 and 25c per doz. extra
do. M. Rowland & Co., dis 30 and 25c " "
do. O. Ames & Son, dis 17½ % and 5c " "
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished ₱ lb 12c
Solid Cast Steel " 30c
Spaths and Cradles.—Seymour Mfg. Co.'s dis 50 %
Sorghum Machinery.—Bell Cane Mills dis 30 %
Scantlin's Seamless Evaporators dis 12½ %
Springs.—Cleveland Spring Co.'s—
Carriage and Express dis 12½ %
Blue Seat Springs dis 15 %
Thimble Skeins.—Whitewater's dis 40&10 %
Vises.—Solid Box ₱ lb 10c
Wilson Mfg. Co.'s dis 15 %
Wheelbarrows.—Champion Iron Wheel, ₱ doz $35·00
Champion Wood Wheel ₱ doz $29·00
" Garden ₱ doz. $40 net
Wrenches.—Coes' Genuine dis 35 %
Coes' Pattern dis 50 %
Wagons.—Whitewater Farm Wagons—
Thimble Skein 3 in. $74; 3½ in. $78; 3¾ in. $79
Iron Axle 1⅝ in. $75; 1⅞ in. $81; 1⅞ in. $88

St. Louis Metal Market.

(Corrected Weekly by Messrs. H. Sellew & Co.)

Tin Plate.

IC, 10x14, Best Char.	$ 9·00	IX, 14x20, Roofing	$11·00
IX, 10x14, "	11·50	IC, 20x28, "	15 00
IC, 12x12, "	9·50	IX, 20x28, "	12·50
IX, 12x12, "	12·00	IC, 10x14, Coke	8·00
IC, 14x20, "	10·00	IC, 14x20, "	8 50
IX, 14x20, "	12·50	IC, 10x20, "	12·50
IC, 14x20, Roofing	8·50		

Usual difference for odd sizes.

Block Tin.

Strait's, Large Pigs	24c	do Small	25c
Eng. Ref'd, Large Pig	24c	Bar	26c

Sheet Zinc.

Casks ₱ lb 10c | Sheet ₱ lb 10¼c

Solder.

Extra in Bars	17c
No. 1, in bars	16c
No. 2, "	15c
Roofing	14c

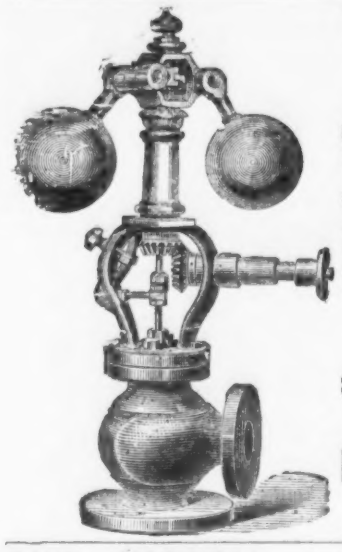
Sheet Copper.—

Brazier's, 30x60, 14 to 100 lbs. Sheets	32c
" " 10 and 12 lbs. "	34c
" " 6, 7, 8 and 9 lb. Sheets	36c
Tinned, 14x48, 14 and 16 oz.	32c
Planished, 14x48, 14 and 16 oz.	38c
" Boiler Sizes, 14 and 16 oz.	40c
Copper Bottoms	34

Sheet Iron.—

	Com'n.	Sm'th.	Char'l.	Jn'ta
No. 16 to 20	4 c	4¼c	6¼c	7¾c
No. 22 to 24	4 c	4¼c	6¼c	7¾c
No. 25 & 26	4¼c	5 c	6¼c	8 c
No. 27	4½c	5¼c	6¾c	8¾c

Galvanized Sheet Iron dis 30 %
Iron Rivets dis 25 %
Iron Wire dis 40 %
Copper Rivets and Burs dis 30 %
Genuine Russia Iron.
Perfect—No. 8, 10, 11, 12 per lb. 16c
Stained—No. 8, 10, 11, 12 per lb. 15c
Tare 22 lbs to Bdle. For less than 1 Bdle. add 1c. ₱ lb



TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

ShiveGovernorCo

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,

AND

Buoy's Patent Counter Scale,

No Nest of Weights.

Circulars sent free

THE JUDSON GOVERNOR.

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

Reduced Price List,

JANUARY 25th, 1876.

☞ For dimensions of Governor, see Illustrated Price List.

THE JUDSON PATENT

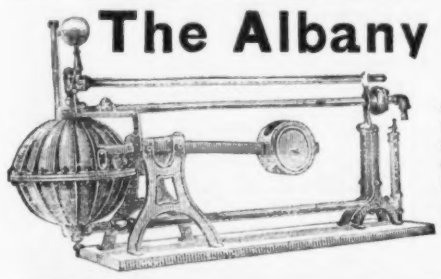
Improved Steam Governor.

Size, Inch.	Plain.	Bright Finished.	Extra for Lever.	Stop Valve.
¾	$17·00	$19·00	$1·90	..
¾	19·00	21·00	1·90	..
1	21·00	24·00	2·00	$5·00
1¼	25·00	28·00	2·25	6·00
1½	29·00	33·00	2·50	8·00
2	35·00	40·00	2·75	10·00
2¼	42·00	48·00	3·25	14·00
2½	45·00	51·00	3·50	15·00
2¾	49·00	56·00	3·75	17·00
3	55·00	63·00	4·25	20·00
3½	64·00	73·00	4·50	25·00
4	74·60	84·00	5·00	30·00
4½	86·00	97·00	5·50	36·00
5	94·00	106·00	6·00	42·00
5½	112·00	125·00	6·50	48·00
6	125·00	138·00	7·00	54·00
7	150·00	165·00	8·00	68·00
8	185·00	202·00	9·00	80·00
9	205·00	225·00	10·00	..

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

The Albany Steam Trap.



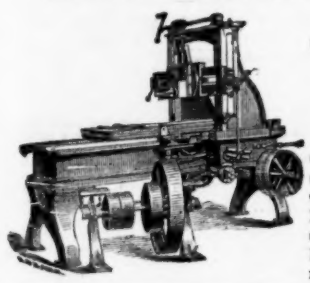
This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
Albany, N. Y.

The Pratt & Whitney Co.,

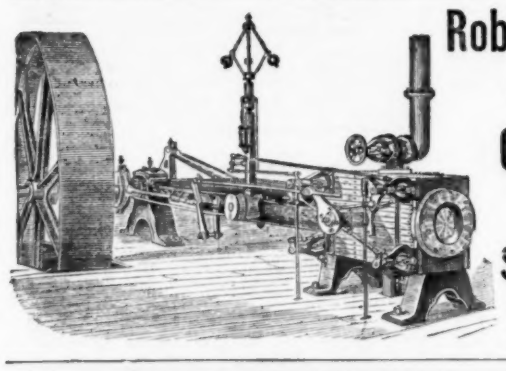
Hartford, Conn.,

Have constantly on hand and making



Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co

CHESTER, PA.

Corliss Engine BUILDERS.

Shafting & Gearing, Boiler Makers.

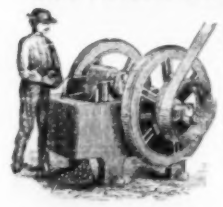
THORNE, DeHAVEN & CO., Drilling Machines,

21st Street, above Market, Philadelphia.

PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
VERTICAL DRILLS. Self-feeding.
MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BORING AND DRILLING MACHINES.
HAND DRILLS. CAR BOX DRILLS.
SPECIAL DRILLS. For Special Work.

BLAKE'S PATENT
STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

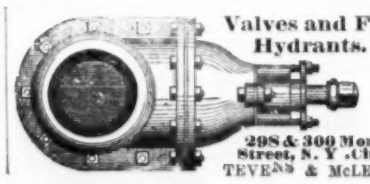
IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

For Illustrated Circulars, and particulars, address.

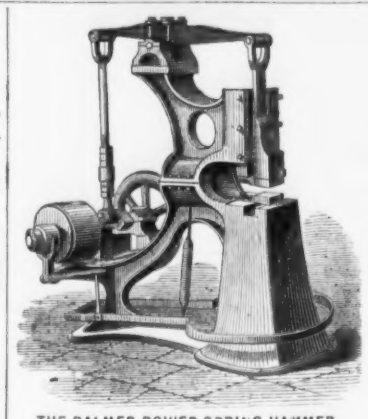
BLAKE CRUSHER CO., New Haven, Conn.

Stevens & McLean
298 & 300 Monroe St.,
New York,
AGENTS.

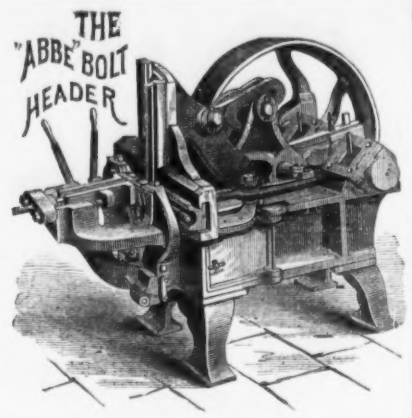


Valves and Fire Hydrants.

298 & 300 Monroe Street, N. Y. City.
STEVENS & McLEAN.



THE PALMER POWER SPRING HAMMER.



Of these Machines we are building sizes to meet the requirements of all Manufacturers and Workers of Iron and Steel. In simplicity, durability, ease of operation, accuracy, and range of work, we guarantee them superior to any Machines of their kind produced in the world. For prices, references, and full descriptive circulars, address

S. C. FORSAITH & CO.,

Manchester, N. H.

Knowles Patent Steam Pumps

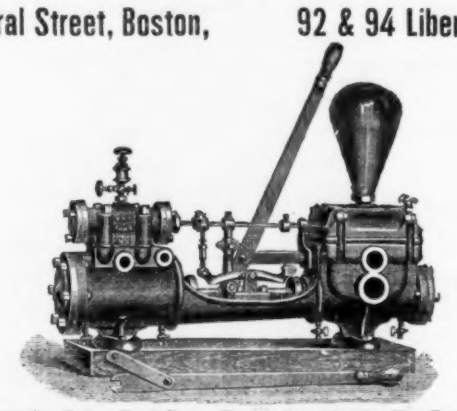
MANUFACTURED BY THE

KNOWLES STEAM PUMP WORKS,

WARREN, MASS.

WAREHOUSES:

14 & 16 Federal Street, Boston, 92 & 94 Liberty Street, N. Y.

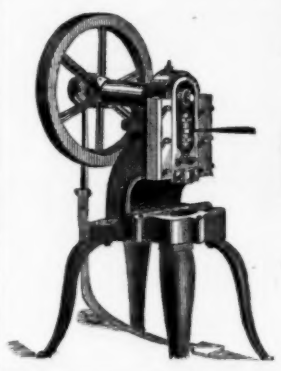


Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

FIRE PUMPS a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

Every machine furnished under a complete guarantee.



A. H. MERRIMAN,

Patent Power

Punching Presses.

Patentee and Sole Manufacturer.

I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

West Meriden, Conn.

Machinery Hall, Philadelphia, Section B 4, Columns 28 and 29.

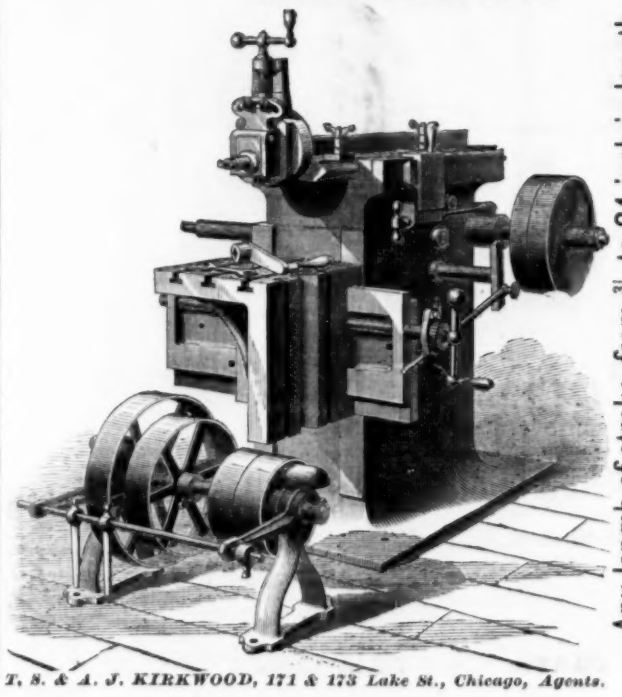
THE HENDEY MACHINE CO.

MANUFACTURERS OF

THE MANVILLE

Patent Planers and Shaping Machines.

WOLCOTTVILLE, CONN.



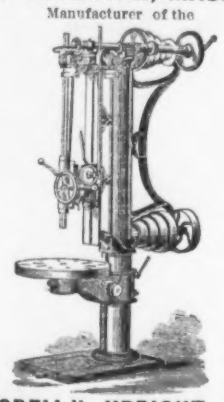
Any length of stroke from ¾ to 24 inch in length, while machine is running with perfect uniformity of speed of cutting tool. Automatic cross feed of 19 inch and 16 inch, from top of table to bottom of slide when table is down. Send for Circular and Price List.

T. S. & A. J. KIRKWOOD, 171 & 173 Lake St., Chicago, Agents.

P. BLAISDELL & CO.,

WORCESTER, MASS,

Manufacturer of the



"BLAISDELL" UPRIGHT DRILLS

And other First-Class Machinists' Tools.

AMERICAN NATURAL OIL CO.

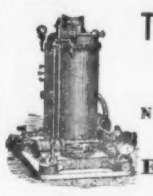
DEALERS IN ALL KINDS OF

Lubricating Oils.

West Virginia Lubricating Native Rock Oil!

Used by most of the Railroads in the United States, Canada and Europe, and by Mechanics on all kinds of Machinery. The Safest, Cheapest and Most Reliable Lubricator in the world. Obtained the Highest Prize at the Paris Exposition. 28, 29, 30 and 31 Gravity.

No. 26 CEDAR STREET, NEW YORK.



The Whitmore Engine.

SAFEST, CHEAPEST & BEST.

Lovegrove & Co.,

No. 121 South Fourth Street,
PHILADELPHIA, PA.
Sole Manufacturers

Engines, Boilers and Steam Pumps.

The Almond Drill Chuck

THE BEST DRILL CHUCK IN THE MARKET.

Is Simple in Construction, Self Centering and very Strong.

Will hold, with a perfectly tight grip, from 5-16 to 0, and weighs but 12 oz.

Price, $5·00 each.

Liberal discounts to the trade.

AGENTS,

FRASSE & CO., 62 Chatham St. N.Y.

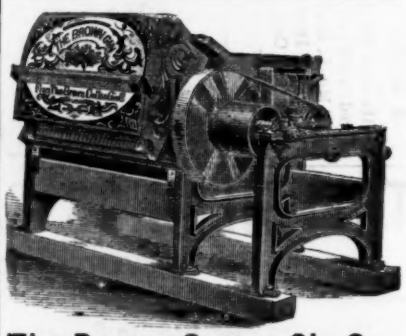
OHL & HAUSCHILD,

Engineers & Machinists

And manufacturers of

Lathes, Shapers, Slotters, Planers, Gear Cutters, Drill and Power Presses, Pulleys, Hangers and Shaftings, Machinery and Machinists' Tools in general.

57, 59 & 61 Passaic Avenue,
Kearney (East Newark), N. J.



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NEW LONDON, CONN.

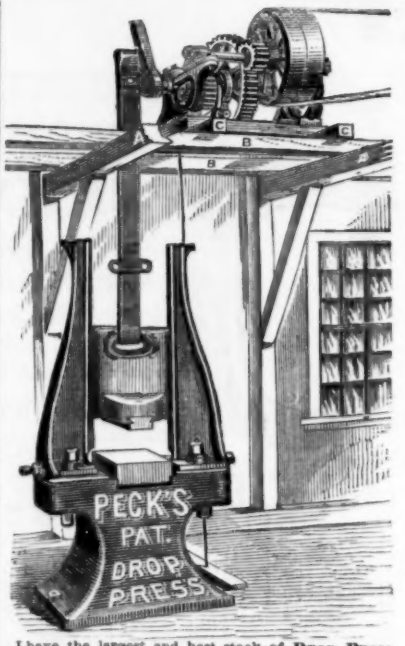
Manufacturers of

COTTON GINS,

With or without

Self-Feeding Attachment & Condenser.

Cotton Gin Saws, Ribs and other Gin materials. **Also Albertson's Segment Screw Cotton,** and Hay Press. Send for Circular.



I have the largest and best stock of **Drop Press Patterns** in the country—suitable for Forging, and all kinds of Sheet Metal work.

WHY THE BEST:

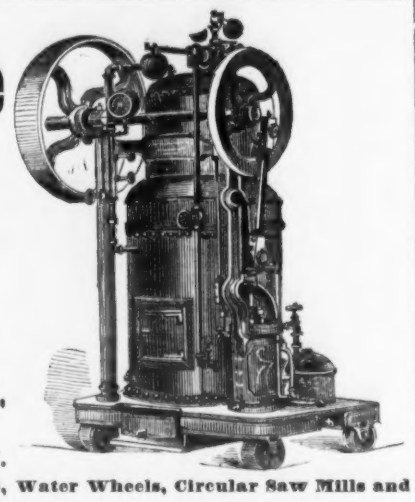
It requires less power, works faster, gives a harder blow with same weight of hammer, the rebound of the hammer is caught without lessening the force of the blow, the blow is uniform and not affected by variations in the speed of the driver. It is always in order. **The Drop Press a specialty.**

MILO PECK, New Haven Conn.

Machinery, &c.

THE

Shapley Engine



Patented Feb. 10, 1874.

COMPACT,
PRACTICAL,
DURABLE,
ECONOMICAL.

$200·00.

Cheaper than any Engine offered of the same capacity.

MANUFACTURED BY

SHAPLEY & WELLS,
Binghamton Iron Works,
Binghamton, N. Y.

Manufacturers of **Steam Engines, Boilers, Water Wheels, Circular Saw Mills and Mill Work generally.**

BUSH HILL IRON WORKS,

Corner 16th & Buttonwood Streets
PHILADELPHIA.

JAMES MOORE,

(Successor to MATTHEWS & MOORE,)

Engineer, Machinist, Founder and Boilermaker

CASTINGS of every description.

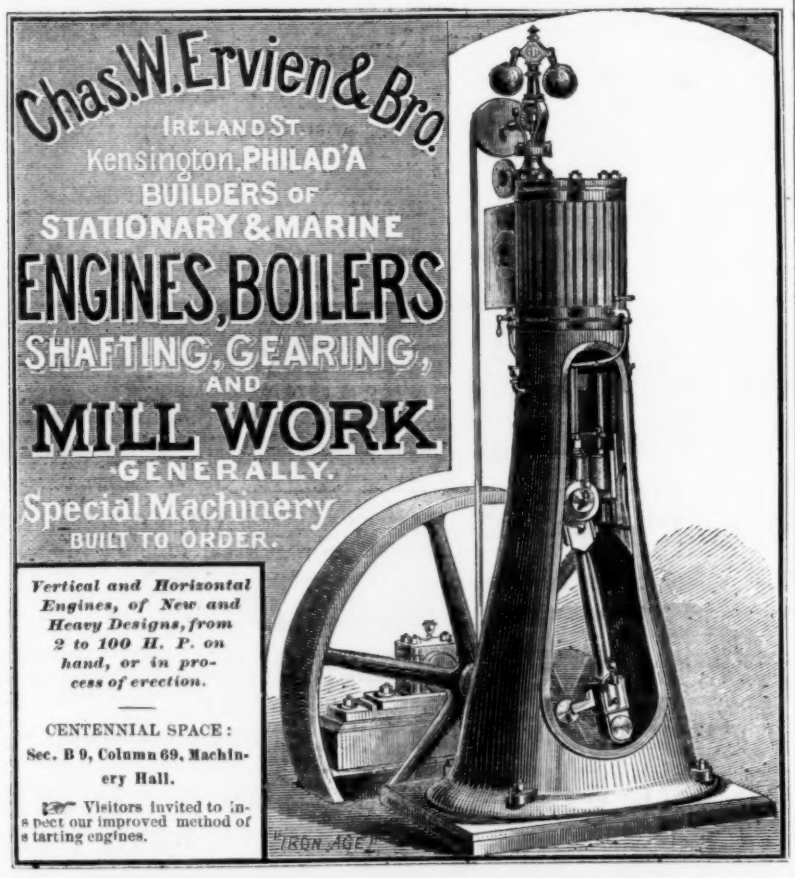
ROLLING MILL AND FURNACE EQUIPMENTS COMPLETE

Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or Composition Metals.

Sugar Mill, Saw Mill and Grist Mill Machinery,

AND MILLWRIGHTING IN GENERAL.

BOILERS—FLUE, TUBULAR AND CYLINDER, and all kinds of TANK AND PLATE IRON WORK.



Vertical and Horizontal Engines, of New and Heavy Designs, from 2 to 100 H. P. on hand, or in process of erection.

CENTENNIAL SPACE:
Sec. B 9, Column 69, Machinery Hall.

☞ Visitors invited to inspect our improved method of starting engines.

☞ **Two First Premiums awarded by Franklin Institute Exhibition of 1874.**

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Manufacturers of Latest Improved Machine Tools, Rotary Shapers, two sizes, Iron Planers, all sizes, Horizontal Drill Attachments, for upright power drills, Self-feeding Portable Drills, hand or power, Expansion Boring Bars, five sizes, Universal Slide Rest, for taper work, Twist Drill Sharpening Machines, automatic and adjustable in every direction. Noiseless Friction Gears, for transmitting up to thirty horse-power.
Send for Descriptive Circulars.

OVER 300 IN SUCCESSFUL OPERATION.

The "Dead Stroke"

Power Hammer

With Belden's Recent Improvements.

Guaranteed the best in Every Essential. **Takes Less Room, Less Power,** and costs **Very much Less for Repairs** than any other. Send for descriptive circular with names of over 200 using them—(to whom we refer.)

THE HULL & BELDEN CO.,

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If we are advised as to the average work for which hammer is required, we will furnish the proper size and **guarantee** satisfaction or no pay.

WE ALSO MANUFACTURE

Machinists' Tools & Special Machinery.

THE "CLIMAX" PIPE WRENCH,
(Latest and Best.)

THE "DANBURY" DRILL CHUCK,
(Recently improved and reduced in price.)

Hardware Specialties to Order. Models, Dies and

IRON & STEEL DROP FORGINGS.

Machinery, &c.

Established 1848.

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Engineers, Iron Founders and Machinists.

RAILWAY SHOP EQUIPMENTS.

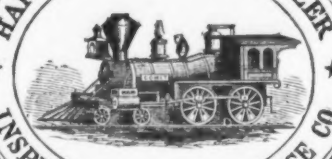
Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters
Are of Improved and Patented Construction.

Railway Turning and Transfer Tables,
SHAFTING & MILL GEARING, a specialty.

Pivot Bridges.

☞GIFFARD'S INJECTOR--IMPROVED, SELF-ADJUSTING.☜

HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.



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COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS

Full information concerning the plan of the Company's operations can be obtained at the

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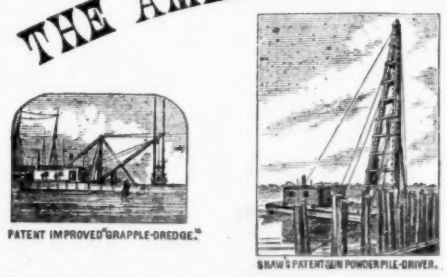

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SHAW'S PATENT GUN POWDER PILE-DRIVER.

IMPROVED "DIPPER-DREDGE."

BUILDERS OF STEAM DREDGING MACHINES,

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CONTRACTORS FOR

IMPROVING RIVERS AND HARBORS,
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Offices, No. 10 South Delaware Ave., Philad'a.

Keystone Pressure Blowers.

Anti-friction and noiseless; maximum blast and minimum power; all sizes for

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ALSO

KEYSTONE EXHAUST BLOWERS.

Made on same principle,

For Ventilating Mines, Buildings, etc.; Removing Dust, Shavings, etc.; Drying Wool, Lumber, etc. Every Blower Guaranteed. Send for circular, or call and see them in operation.

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120 Exchange Place, Philadelphia.

Also, sole manufacturers of the celebrated **KEYSTONE PORTABLE FORGES,** for all classes of work, from the lightest to the heaviest.

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MAKER AND PATENTEE OF

Hydraulic Jacks and Punches,

ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

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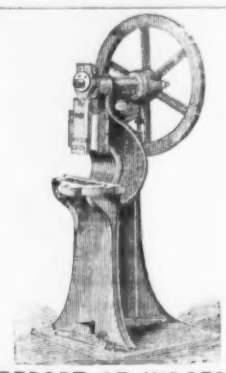


REPORT OF JUDGES

In Department V, Group 3, at the 44th Exhibition of the

AMERICAN INSTITUTE,

Held in the City of New York, Oct., 1875.

No. 318, Drawing, Drop & Punching Presses.

THE STILES & PARKER PRESS CO.,

Of Middletown, Conn.

The machinery exhibited by these makers is of a character that calls for special commendation. In addition to their well known punching presses, to which a new feature has been added in a press adjustable to an inclination for discharging work left above the die, there are exhibited by them a combined punch and shears, a drawing or blanking press, and a drop.

In all these there is shown the highest mechanical culture, applied to meet every practical requirement, to avoid every practical difficulty, and to enlarge the range of application of the machines, by devices which are at once simple, elegant, and effective.

Your committee would unhesitatingly recommend for this exhibition the "Medal of Progress," but find such award debarred by the rule of the Institute, forbidding such award unless a Silver Medal has been previously awarded. We, therefore, respectfully recommend the award of a Silver Medal.

Silver Medal Awarded.

A true copy from the Report on file.

JOHN W. CHAMBERS, Sec'y.

AQUOMETER Steam Pump.

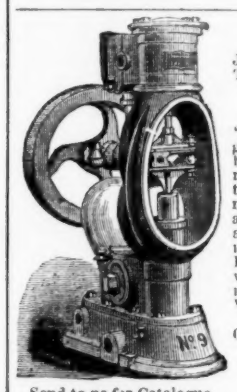
Highest Premium awarded by Franklin Institute, 1874,

For Simplicity, Economy of Construction & Efficiency.

An absolutely Durable, Cheap, Efficient and Economical Steam Pump. Requires no special care or lubricating. Warranted. Address for circular,

AQOMETER STEAM PUMP CO.,

10 South Dela. Avenue, Philadelphia,



WASHINGTON, D. C., Sept. 13, 1876

JNO MAYER,
Treas. Valley Machine Co., East Hampton, Mass.

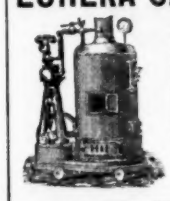
DEAR SIR: The "Wright Bucket Plunger Steam Pump" you built for the Government "works like a top." Am sure it has never had its equal in any of the departments, and I have no hesitancy in recommending this Pump to any one in want of a first-class, noiseless Steam Pump. Very respectfully,

J. THOS. MILLER,
Chief Engineer U. S. House of Representatives.

Send to us for Catalogue.

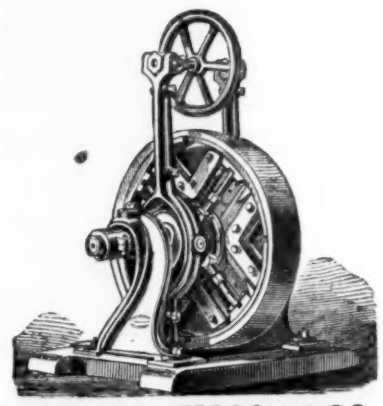
Valley Machine Co.

EUREKA SAFETY POWER!



Practically **impossible to explode.** Tested to 300 lbs. pressure per square inch. Will slit ⅜ inch seasoned oak—grind 8 bushels Corn per hour. **Price $250.** Also, Stationary Engines and Boilers and **Spark Arresting Portable Engines** for plantation use. Send for our circular. Discount to the trade.

B. W. PAYNE & SONS,
Corning, N. Y.



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Manufacturers of PATENT

FRICTION PULLEYS,

Friction Clutches

For Connecting Shafting and Gearing,

ELEVATORS.

Lafayette Street, PROVIDENCE, R. I.

TUBAL SMELTING WORKS,

760 South Broad Street, PHILADELPHIA.

PAUL S. REEVES,

MANUFACTURER OF

ANTI-FRICTION METALS.

AXX Genuine	40c	C	20c
XX	38c	D	15c
X	32c	E	13c
A	30c	F	11c
	25c		

"Note."—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

BRASS CASTINGS, 21 to 35c. | INGOT BRASS, 19 to 28c. | BRASS TURNINGS AND OLD METALS WANTED.

ESTABLISHED 1842.

WM. & HARVEY ROWLAND,

PHILADELPHIA,

P. O. Address: Frankford, Philad'a. | MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform AND C Springs,

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
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OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.
BESSEMER SHOVEL AND PLOW STEEL.
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RE-ROLLED NORWAY SHAPES.
NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.

Iron Clad Can Co.,

23 CLIFF STREET, N. Y.

THIS CUT REPRESENTS THE

IRON CLAD

FIRE SHOVEL

Which every dealer should see before making his fall purchases. It combines beauty, strength and cheapness. It is stamped from one piece of metal (both blade and handle), the handle is round and attached to the blade in such a manner as to make it the strongest, as well as the cheapest shovel ever manufactured.

Manufacturers of **STAMPED WARE, CAN TRIMMINGS, COAL HODS, Etc.**

Send for Price List.

Edgar's Patent "Gem" & "U. S." Stove Shovels.

THE

"GEM"

Stove Shovel

Is now

Universally Used in the United States,

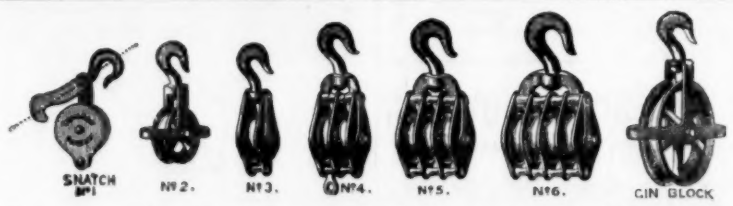
And kept in stock by all first-class jobbers in hardware, tinware and stoves.

The immense demand for this very popular article has induced certain manufacturers to *infringe* on our Patents. We therefore notify the trade that we will **prosecute all infringers,** whether manufacturers or dealers.

Observe our trade-mark and buy only the genuine.

Send for price list.

EAST RIVER S. M. MFG. CO., Sole Manufacturers, 206 Water St., N. Y.



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FOR ROPE OR CHAIN.

Weston's Patent Ratchet Drill.
Duplex Punch.
Very Powerful and easy to work.
Self-Sustaining Rope Pulley Blocks.
Same as the ordinary block, but sustains the weight at any point.

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STEEL CASTINGS.

A Substitute for Steel and Wrought Forgings.

☞ Circulars sent on application. ☜

Steel Castings

We make Steel Castings true to pattern, sound and strong. Can be worked same as bar steel. Plowshares, Mold-boards and Land-sides, Anthracite Coal-breaker Teeth, Wheels and Pinions, Dies and Hammer Heads, Engine and Machinery Castings of all descriptions, Railroad Frogs and Crossings.

Invaluable for all articles requiring great strength and durability.

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PITTSBURGH STEEL CASTING CO.,
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Cast Steel Castings.

Light and Heavy Castings made on short notice. Solid, ductile, true to pattern, can be readily forged and tempered. *Post Office Box 733.*

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TUBULAR LANTERNS,
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BRASS and IRON
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SLIGO IRON MILLS

Established 1825.

PHILLIPS, NIMICK & CO.

The only Manufacturers of

"Sligo" Fire Box Iron, Boiler Plate, Sheet and Bar Iron,

AND

"Tyrone" Brand of Bar, Tank & Sheet Iron, Girder and Ship Plates, Angle and Horse Shoe Iron, &c., &c.

Plates Rolled 100 inches wide.

OFFICE AND MILLS,

South Side, Pittsburgh, Pa.

Sligo Stay Bolt Iron, Warranted Unexcelled.

BOILER HEADS & FLUE HOLES FLANGED TO ORDER.

Quality our Specialty.

UNIFORM SPEED

WARRANTED THE MOST PERFECT GOVERNOR IN THE WORLD

However great or violent may be the change of load We will warrant any positive Uniform speed of Engine desired.

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Do Your Own Printing!

$3 Press for cards, labels, envelopes, etc. Larger sizes for larger work. **Business Men** do their printing and advertising, save money and increase trade. Pleasure and profit in **Amateur Printing.** The Girls or Boys have great fun and make money fast at printing. Send two stamps for full catalogue of presses, type, etc., to the Manufacturers, **KELSEY & CO., Meriden, Conn.**

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Improved French Casters

The Simplest in construction and most reliable ever offered to the public. Can be put on in half the time, and more permanently than the ordinary kinds. Send for Illustrated Catalogue.

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Small Gray Iron and Brass Castings.

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Brass Works,

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Manufacturers of

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AND OTHER

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Carriage Bolts made from Best Square Iron, a Specialty.

THE

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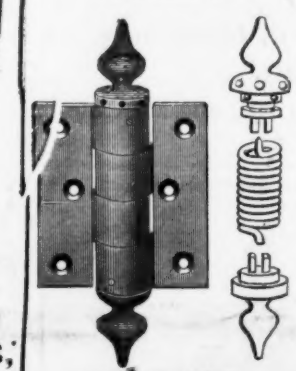
FOR CLOSING DOORS, AND SWINGING THEM EITHER WAY.



SINGLE ACTION BUTT, SWINGS DOOR ONE WAY.

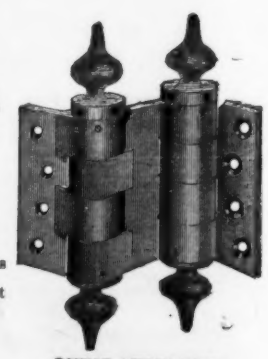
Very Powerful,

UNIFORM IN ACTION,

AND

Durable.

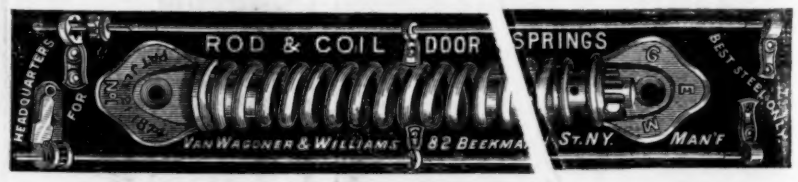
Indorsed by constant use for years on the best buildings throughout the country.



DOUBLE ACTION BUTT, SWINGS DOOR BOTH WAYS.

Manufactured by

AMERICAN SPIRAL SPRING BUTT CO., 82 Beekman Street, N. Y.



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B. W. BALDWIN, Manufacturer of

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Castings for Cars, Mills and Machinery. Also supplied in Ingots to the trade. Guaranteed to be the safest and most durable Journal Metal made.

M. B. STOTLER, Gen'l Manager.

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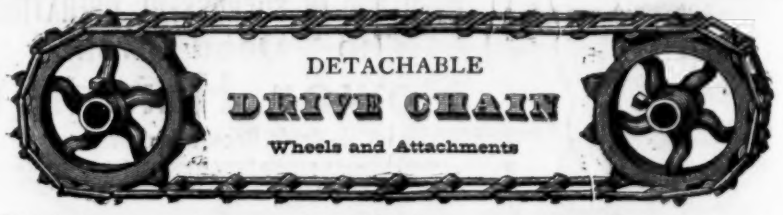
Manufacture the most reliable

SILVER PLATED SPOONS & FORKS.

They are plated by weight, and not by time or guess, containing 20 per cent. more silver than the usual standard, on a base of Nickel Silver, and finished by hand. Each article is guaranteed by the trade mark and warranted to give full satisfaction. We ask of the trade a fair and impartial test, assuring them that the high standard already attained, shall be maintained. Send for Catalogue and Price.

J. M. CARPENTER, Manufacturer of FIRST-CLASS TAPS and DIES, Pawtucket, R. I



Positive transmission. Stands **Exposure.** **Noiseless** in service.

NO Friction. Tension. Stretching.

Runs **Fast** or **Slow,** on all size wheels. Runs **Perpendicularly.**

For carrying **Buckets** and **Attachments** it has no equal.

Is a **Profitable Substitute** for Belting, Shafting, Gears and Ropes.

Adapted to all kinds of **Machinery.** Finds various uses in **Mills, Mines, &c.**

☞ Plans for any purpose furnished on application. ☜

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